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THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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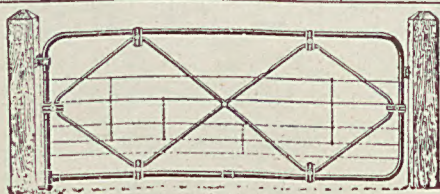
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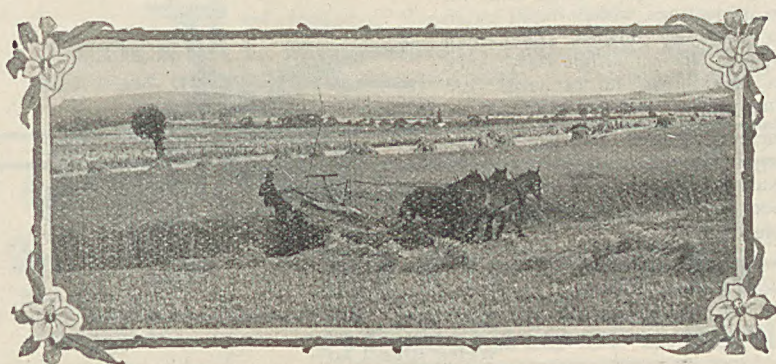
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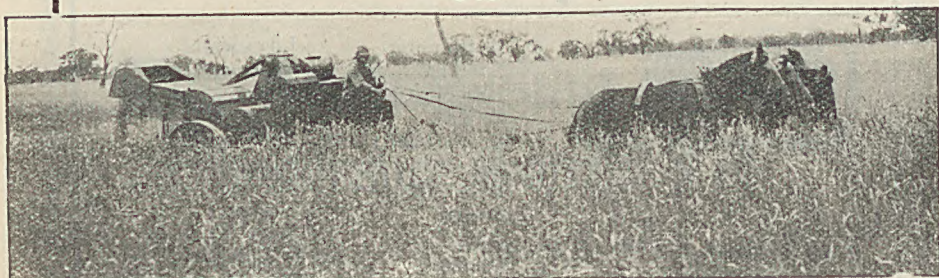


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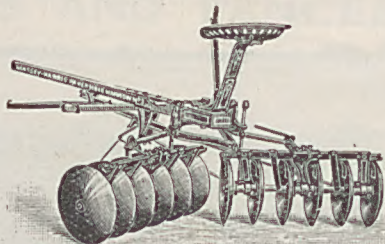
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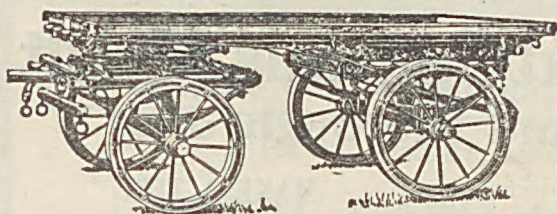
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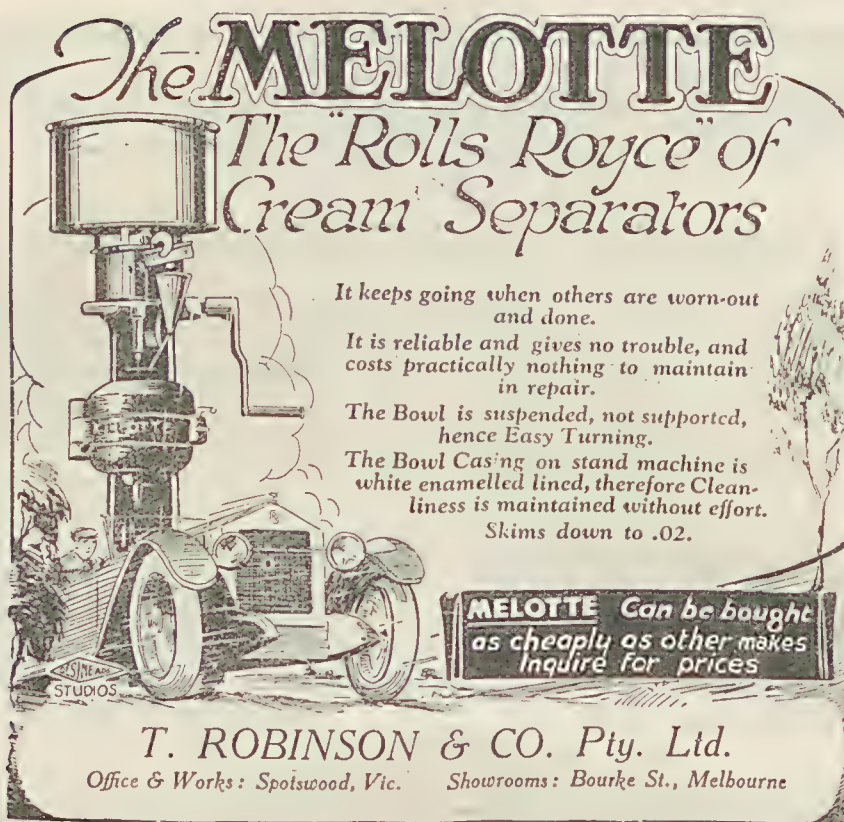
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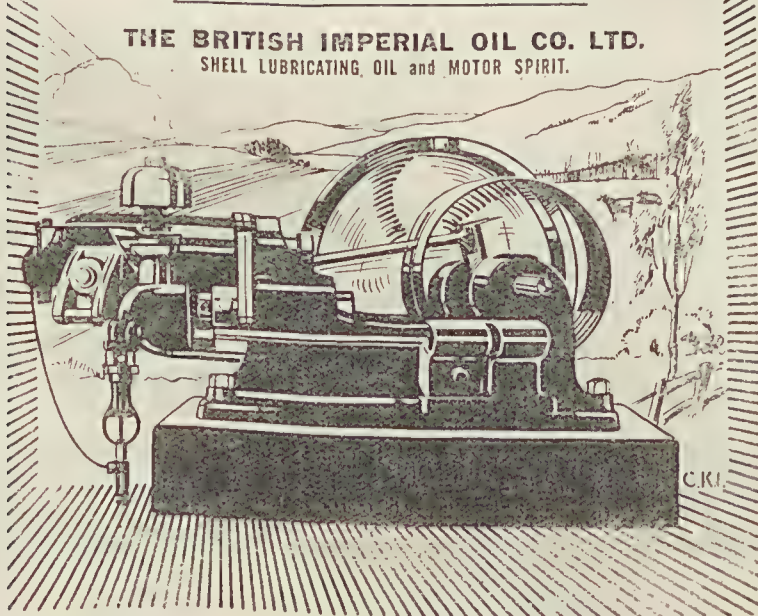
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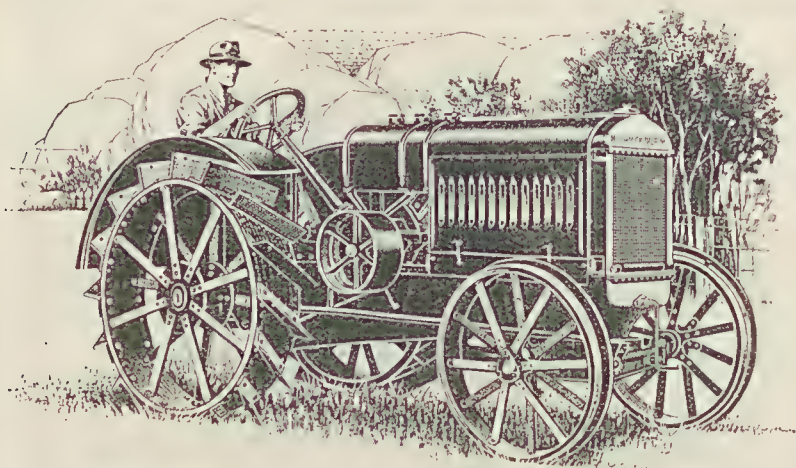
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THE JOURNAL
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Vol. XXI.

December, 1923.

Part 12.

APRICOT GROWING IN VICTORIA.

By W. H. Nicholls, Orchard Supervisor.

I.—Introduction.

The native country of the apricot is unknown. It is found wild in places remote from each other, but whether introduced there or whether indigenous to all, is a matter we are entirely ignorant of. Armenia is said by some authorities to be its country of origin, a circumstance that led Linneus to name this species of *Prunus*—“*Armenica*.” Lamark in “*Illustrations des Genres*” has founded a genus under the title “*Armeniaca*” and called the apricot “*Armeniaca vulgaris*.” The apricot appears to have found its way into Italy, and probably from there was brought to Britain some time prior to 1562, as Turner in his “*Herbal*” mentions that in that year it was being cultivated in England. Again, Haklayt asserts that it was brought into England by Woolfe, a French priest, and gardener to Henry VIII.

Like its near ally, the peach, the apricot is evidently a native of a hot country, and though large areas are devoted to apricots in different parts of Victoria, a warm district is required to bring the fruit to perfection. Apricots are grown in various situations and soils, and the stocks best suited for the varying conditions require careful consideration. This is a matter that will be discussed later.

Unlike peaches, the picking season for apricots is short. Most varieties ripen within a few days of each other, the whole season extending over only three or four weeks, whereas there is a succession of varieties of peaches from December to April. The short season and the uneven ripening of the fruit necessitate a large number of pickers at harvest time. Another difficulty is that seasonal conditions sometimes so interfere with the development of the fruits that the ripening of the early varieties is delayed, with the consequence that they come in with the main crop.

The "commercial" life of the apricot tree is much longer than that of the peach. Perhaps no other tree so lends itself to "rejuvenation processes," and by judicious pruning and feeding, trees may be made revenue producers even after they have reached the age of forty years, and there are in Victoria apricot trees fifty years old still bearing fine crops of saleable fruit.

In this State some four thousand acres are devoted to this fruit. A great deal of this area has been planted during the last five or six years, the greatest increase being in the northern districts. With the increasing facilities for processing and the many ways in which apricots may be used, it should be only a matter of organization amongst growers to find a market for this variety of fruit which has so much to commend it.



Moorpark Apricot Tree (35 years old) on Plum Stock, Growing at Lancaster, Victoria.

II.—Soils and Stocks.

Apricot trees thrive better on fairly heavy soils than on light ones. They require more moisture than peach trees, and soon show signs of distress if there is a lack of it at any time of the year.

It is essential to select stocks to suit the soil. If the soil be on the light side, peach stocks (which give quicker growth and earlier fruiting) should be used. Such stocks are obtained by sowing stones of a good yellow-fleshed, free-stone variety. The following method will be found the most satisfactory to obtain a strike of even stocks:—Make a composition of three parts sandy loam and one of short, well-decayed stable

manure; mix them well, and place a layer about 2 inches thick on the bottom of a box (or pit if in the open) and sow a layer of stones on it. On these put another 2-inch layer of the composition and on this sow a further lot of stones, and so on until the box or pit is filled. Each lot of stones should be sprinkled with water, and an even temperature should be maintained throughout the germinating period. Usually from two to three weeks will elapse before the shells open.

It is always a good plan to get the stones planted out before the growth actually appears. A piece of well worked fallow is found most suitable for planting out these "started" stones, so that freedom from weeds may be ensured. The rows should be 3 ft. 6 in. apart,



Ouillin's Early Apricot Tree (35 years old) on Plum Stock.

the stones sown about 3 inches deep, and from 4 to 6 inches apart in the drill, and covered with a nice light sandy loam. This sowing should take place not later than the end of August, to ensure strong vigorous seedlings fit for budding in February or March.

If the soil be a rich heavy loam with good natural drainage, the apricot on its own root makes a splendid tree. The method of raising the seedlings is exactly similar to that of obtaining the peach stocks just described.

For the heavier soils with a retentive subsoil, or, in fact, one might say for any soil with a retentive subsoil, plum stocks give the best

results, but care must be taken to obtain stocks of a non-suckering variety. The *Myrobalan* stock is most favoured for the purpose. As a general rule these stocks are obtained from the planting of cuttings, which are taken in winter, and made from 12 to 15 inches long, and planted out in nursery rows in August. Although a percentage of them may be fit for budding purposes the following autumn, they are usually left until the next season, when good strong stocks will ensure robust trees. Stones of this plum are also obtainable in some places, and are treated similarly to those of the larger stone fruits.

A good deal has been heard of late years regarding the life of trees under irrigation, and there is no doubt that the question of suitable stocks is one of primary importance in all irrigation areas. When we consider the types of soils predominating in the Goulburn Valley, for instance, where irrigation is so extensively carried out, the natural deduction is that plum stocks will produce longer-lived trees than peach stocks.

Right through the Goulburn Valley frequent changes of soils in comparatively small areas are to be found. On blocks at Lancaster and Tongala as many as four distinct changes may be seen in some small orchards. The difficulties of the grower are thus increased, for if he decides to plant, say, a 20-acre block of stone fruits, he must select stocks according to the different changes of soil, if a uniform plantation is to be had. During the past season, it was noticed repeatedly that where the apricot was worked on plum stocks, good crops were obtained, and this in a dry season; in fact, one of drought. This denotes that the plum stock is a great "forager," and adapts itself to the necessity of having to "travel deep" for moisture during such a long dry spell as obtained during the winter and spring of last year.

On another block, apricots on their own roots, and apricots on plum stocks were growing side by side, and the result was practically no crop on the former and a good one on the latter. In this particular instance, the soil generally is of a rich sandy loam overlying a fairly retentive red clay subsoil. In another case the trees were on their own roots, planted in heavy grey buck-shot land of good depth, and they bore a fine crop, due, no doubt, to the moisture content of the soil in the early part of the growing season.

Still another instance may be quoted. Fourteen acres at Kyabram of rich, sandy loam, 11 inches deep, overlying a porous clay subsoil, beneath which is a yellow sandy wash, is given up to apricots grown on their own roots. It is one of the finest blocks of apricots in the Goulburn Valley, and has yielded many fine harvests. Last season the crop was very good, a result, no doubt, due to the fact that autumn ploughing and cultivation whenever practicable had conserved sufficient moisture to ensure plump buds and fruiting spurs, for unless moisture be present in the early stages of bud development, the buds become debilitated, and the subsequent setting of fruit is interfered with.

These instances all go to show the important part stocks play in the successful growing of apricots, and also show the necessity for careful cultivation of the soil. Care must be exercised in the application of water in irrigation districts, for an over-supply may so radically change the nature of the soil that the trees will be unable to perform their functions properly.

(To be continued.)

SOFT FRUITS STORAGE EXPERIMENTS.

Resumé of Preliminary Report by D. B. Adam, B.Agr. Sc., Department of Agriculture.

Experiments were conducted last season in the storage of soft fruits, when pears and peaches from the Goulburn Valley and from Doncaster, and plums, were stored under different conditions. The results have been satisfactory and promising.

Pears.

The pears—William Bon Chretien—were forwarded, on various dates, from several places between 30th January and the 28th February, so that, among other things, an estimate of the best time to pick was possible. A uniform system of packing in trays with wood-wool was used throughout, but some differences were made in the wrapping papers used.

RESULTS.

While there is little difference in the keeping qualities in cool store between early and later picked fruit over a three months' storage period, a very striking difference manifests itself soon after each lot of fruit is removed from storage, especially in that which has been kept at a low temperature. The earlier picked fruit turns black in the skin in patches over the whole area, but particularly about the stalk end. This has been termed "pear scald." The term, however, is perhaps in a way unfortunate, since "apple scald"—a well known cool storage trouble—is apparently quite different in its causation. The area immediately subjacent to the blackened areas remains firm, while the rest of the pear softens, as in the ordinary course of ripening; indeed, this blackening does not manifest itself until other areas in the pear begin to soften. This accounts for its more rapid appearance after removal of the fruit from cool storage, when the rate of softening is greatly accelerated. Secondly, pears plucked too early showed, after a four months' storage period, a rapid break-down of the flesh. This contrasted with the comparative soundness, at that time, of fruit picked three weeks later—viz., on 24th February—which time proved the most satisfactory in every respect.

Of the various wrappers used, a single sulphite tissue paper gave the best results. In the actual cool storage process, however, unwrapped fruit possesses advantages—efficient cooling, &c.—but wilting is slightly worse, and on removal of the fruit from store its appearance is not so attractive as wrapped fruit. Pears picked at the correct maturity and placed in temperatures of 31 deg. to 32 deg. F. gave the most satisfactory results. There was no definite difference between fruit which had been stored in the air circulation chamber and that placed in the direct expansion chamber.

Pears gathered at the correct stage of maturity and stored at 32 deg. F. will, after a two months' storage period, remain sound and firm for ten days; indeed, the flavour and juiciness are not properly developed till four days subsequent to their removal from cool store.

COMMENTS ON RESULTS.

Possibly the point most clearly established in the experiments with William Bon Chretien pears was the fact that the best time to pick them for cool storage is a strictly limited one in any district. Those picked too early "scalded" or on removal broke down, and in any case did not develop the juicy aromatic lusciousness so characteristic of a good Williams pear. Those gathered too late seemed, in spite of a low temperature, to ripen too quickly. About Kyabram and Merrigum last year the best period for picking was roughly from the 14th to the 24th February. A second point of importance in pear storage established was the necessity for quickly reducing the temperature of the fruit to 32 deg. F. It is important to see that the pear flesh right to the core is reduced to this temperature. These two points are essentially, it is thought, the secret of successful commercial pear storage.

PACKAGES, ETC.

Naturally, these are designed to carry the fruit in the best possible manner, but in exporting pears on a commercial basis economic considerations and attractiveness would necessarily to some extent determine the method of packing. Shallow trays—18 in. x 14 in. x 3 in.—certainly guard the fruit against violence and consequent mould deterioration, and set it off attractively, but are expensive, and do not allow such an effective and rapid cooling of fruit when stacked in mass, as do some other packages. No definite expression on the question of trays and half cases for use for general export purposes can be made here, since the determining factors are largely economic. The packages preferably should not be lined with paper, and some wood-wool, though a minimum, ought to be used. Pears picked at the correct stage of maturity are so firm that with reasonable care in picking and handling losses from mould fungi would not be large. For local cool storage purposes the flat bushel case (unlined) is recommended. With these the storeman has a reasonably good chance of bringing the temperature down rapidly enough to store the fruit successfully for six or eight weeks on a commercial scale. Finally, it is a frequently expressed opinion that fruit from the south, about Melbourne, will keep better than that from the north—the Goulburn Valley. This may be so, but no evidence was obtained in favour of the idea last season. Perhaps in reality it is a question of the relative times each actually takes to get to cool store. The importance of reducing such time to a minimum has previously been emphasized. The best picking time for fruit grown south from the Dividing Range—at Doncaster—last year was a fortnight later than for that grown in orchards north of the Divide.

Peaches.

The varieties—Elberta, Late Red, and Early Crawford (from the Goulburn Valley), and the varieties Zerbe's No. 1, Belot's Late, Webb's Seedling, Catherine Ann, and Late Crawford from Doncaster—were experimented with last season. None of the varieties from the north stored well. Some of the southern varieties gave most encouraging results. Peaches in cold store generally deteriorate, for one of two reasons, viz., they become dry, spongy and flavourless, or they become

mouldy. In a way, these troubles are mutually exclusive, since sponginess is a characteristic of immature fruit, and mouldiness one of fruit which is too ripe. However, with many varieties a middle way is possible—one in which the fruit is sufficiently mature to avoid sponginess developing, and firm enough not to be bruised if handled with reasonably good care. There is some reason to believe that the sponginess is not due to loss of moisture, but rather to changes causing gelation in the individual cells of the fruit.

Elbertas were obtained in two stages of ripeness. The earlier one was labelled "Sydney condition" and the other "Melbourne condition." The latter after three week's storage was the better of the two. Subsequent to this both lots of peaches became acid and disagreeable to taste. They also lost their juiciness. Of the other northern varieties received the Late Reds stored best, although they also became very acid after five weeks' storage. Early Crawfords were in such an advanced stage when received that they could not be stored at all. This instance emphasizes one of the great difficulties under which northern growers must necessarily labour if they wished to export this class of fruit. Indeed, to the writer it seems, in view of the fact that for best results peaches should be well matured on the tree, that this difficulty is an insurmountable one unless cool storage facilities are established in northern localities.

Webb's Seedling, a Doncaster peach, gave the most promising results in storage. After six weeks' storage the taste and juiciness were excellent, and remained so for eight weeks. Catherine Ann, another Doncaster seedling, also gave good results. The maximum storage life for the fruit to remain in prime condition was, however, slightly shorter than with Webb's Seedling. No fully matured specimens of Zerbe's No. 1, nor of Belot's Late, were obtained, so that, while giving evidence of being sound storage varieties, no actual confirmation of this was made. Late Crawfords appear to lose flavour, and are definitely unsuitable for periods of longer than four weeks' storage.

Picking at the correct time, it has been noted, is probably the most important factor in peach storage; but this "correct" time is a hard one to define, or even explain. Some varieties of peaches are characterized by a definite ridge which is the first area to become soft at ripening. Such a variety should be picked just when this area is going to commence to soften. Softening should be anticipated by a day as it were, though this condition should not be tested by pressure, but rather by the eye, the use of which for this work is soon acquired by experience. The stage at which to pick other varieties is more difficult to estimate correctly—experience alone can judge the time when the fruit is "going to commence to soften."

Having picked the peaches in this condition, it is very necessary to give the most careful attention to their handling, which should be the minimum required, and to its subsequent packing. Packing in trays is recommended. The fruit should be carefully graded both as to size and colour and the trays lined with wood-wool. The fruit should be wrapped in single tissue paper and well bedded in wood-wool, with some wood-wool between each of the peaches to keep them separate. Trays should be separate, and cleats should be nailed on

to the ends of each when putting the lid on. Peaches sent overseas are a luxury to the recipients, who will be prepared to pay well for them. It can only be profitable to send the best fruit in the best condition as to grade and colour. The return will repay the most careful handling. When packed the fruit should be removed to cool store as rapidly as possible and the temperature reduced quickly. The storeman is greatly aided in an instance like this by the grower who packs his fruit when it is cool. Early morning is the best time, since the fruit has had time to cool down over-night. Experiments showed that 34 deg. to 35 deg. F. gave quite as satisfactory a storage product as did 32 deg. F. after six weeks' storage, and at this temperature there is less likelihood of freezing the fruit by its temperature falling too low. However, to store successfully at 34 deg. F. it is essential to see that the packages have been pre-cooled right throughout to this temperature. This is the duty of the land storeman. To do it thoroughly and rapidly he should store the trays at 32 deg. F., or perhaps lower, for the short time that the fruit is in his charge.

Finally, in selecting peaches for cool storage great care should be taken to see that the fruit is free from all trace of, or even liability to, infection from the brown rot fungus, *Sclerotinia cinerea* (Bon) Wor. The disease caused by this fungus, while it may hardly be visible when the fruit is stored, is one which spreads rapidly in cool store, where conditions generally are very favorable for its propagation.

Plums.

The varieties Diamond, President, Prince Inglebert, Pickering, Jefferson, and a green-gage plum, were stored. An attempt was made to differentiate results obtained from fruit stored at different maturities, but there was no appreciable difference in respect to a general softening and apparent dryness which progresses steadily with the time of storage. The softening is accompanied by wilting; subsequently moulds develop. The variety in itself as a factor, rather than any differences in treatment, seems to be the chief one governing the rate of this softening. Jefferson plums remained firm for two months, though the flavour was not so well developed as in the variety Prince Inglebert, which, however, became much softer after storage. The time of picking has a more decided effect on the flavour; the later picked varieties being superior in this respect. As a storage temperature 32 deg. F. is slightly better than 34 deg. F. None of the varieties stored gave a really first class product after eight weeks' storage.

PICKING, PACKING, ETC.

The experiments indicate that especial regard to the time of picking is not so important as with peaches, though they should not be picked too early. A "slightly acid taste" seems best to define this condition. Plums have been exported both in trays and in half cases. Results and reports from London agents indicate that only large attractive fruit, well packed and graded, can be profitably marketed in Britain. This, a necessarily limited trade, is best carried out with trays lightly lined with wood-wool, and by wrapping the fruit in a

single tissue paper; a design thereon would greatly add to its attractiveness. The fruits need not be separated from one another as in the case of peaches.

Summary.

Experiments of a preliminary nature have been carried out with pears, peaches, and plums.

Success in pear shipments rests as greatly with the grower, who must pick his fruit carefully and at the correct maturity, cool it quickly and thoroughly, and remove it at this temperature to the ship's side, as with the ship's engineer, who has to keep it steadily at 32 deg. F., a deed not so difficult to accomplish if the grower and his agent see to their end of the business.

Williams pears grown at Kyabram kept in prime condition for two months, and subsequent to removal remained so for ten more days.

The best time to pick for long cool storage extended last year over the limited period, 14th to 24th February, with northern-grown fruit.

Several varieties of peaches were stored. Those grown at Doncaster gave the most satisfactory results.

The importance of picking at the correct maturity is emphasized.

Webb's Seedling—a Doncaster peach—gave the best results after storage. This variety remained sound for eight weeks.

Packing in trays with ample wood-wool and with great care is recommended.

After thoroughly pre-cooling the trays may be stored at 34° to 35° F.

It is important to see that fruit for cool storage is free from brown rot. Indeed, it is inadvisable to store fruit from trees on which any of the fruit has decayed from this trouble.

Jefferson plums stored for two months gave at that time the firmest product of a number of varieties tested. Prince Inglebert plums retained their flavour better than the other varieties.

For export purposes only large fruit, well graded and packed in trays, are really profitable to handle.

London advices show that attractiveness in packing, &c., is, with all soft fruits, of prime importance to successful and profitable selling.

There can be no doubt that Victoria can grow good quality fruit, but many of her growers have yet to learn the art and value of care in packing this fruit.

Acknowledgment.

The writer wishes to thank orchard supervisors and several growers for much assistance given with the experiments. Special mention should be made of Messrs. Nicholls and Krone, of the Orchard Supervision Branch, and Mr. Webb, of Doncaster; the last-named gentleman, besides supplying fruit, devoted considerable attention to work connected therewith.

HIDES AND SKINS.

DEFECTIVE METHODS OF CURING, ETC.

By J. C. Marshall, Stock Inspector.

Great monetary loss is annually caused by the present-day careless methods of flaying the skins of cattle and sheep, and by the excessive branding of cattle and calves. Other causes which depreciate the value of hides are inefficient curing and the dirty and stained condition in which they are frequently marketed. Still another cause is the injuries sustained by the animal before reaching the slaughter-yard. About twenty-five per cent. of the lighter Victorian hides is damaged by cuts and score-marks received by the living animal through contact with barbed wire.

Local tanners and export buyers are naturally on the watch for imperfections. The defects in past purchases are uppermost in their minds, and where buyers are unable to make a full examination of hides and skins submitted for sale and simply buy on sample, a good margin for safety is usually left by them.

In addition to the hides and sheep skins treated in the tanneries of the several States, a very considerable export trade is maintained. The total value of those exported from Australia during the five years ended 30th June, 1923, was £13,913,093, made up as follows:—

Sheep skins with wool	...	...	£9,263,125
Sheep skins without wool	...	...	899,674
Cattle hides	...	...	3,750,294
			£13,913,093.
A yearly average of	...	...	£2,782,618

Large quantities of hides are imported into Australia mostly from New Zealand and the United Kingdom. The European hides imported are almost wholly heavyweights, being large and heavy, and of even substance without blemish. These are used mostly in the manufacture of belting for mining and machinery purposes. The value of the cattle hides imported for the five years ended 30th June, 1923, was £2,161,888, a yearly average of £432,377.

Some Reasons for Bad Hides.

BAD FLAYING.

Seldom is a perfect hide presented. Hides direct from abattoirs, unsalted and in clean condition and of good shape, are frequently scored or cut. In some cases the scores may be concealed in such a fashion as to be detectable only later on in the tanning process. Skins may be cut while the carcasses are being dressed, and to use a common abattoir expression be "cut out." That is, if the damage be near the edge of the skin, the hole is cut to the edge. The result is an ill-shaped and jagged-edged hide.

In calf skins occasionally pieces of the felm or panniculus and muscle tissue are stuck over or placed on holes or cuts, and by this means an attempt is made to deceive the unwary buyer. These practices are well known in the hide and skin trade and the large discrepancy that the countryman notices between the selling price of his hides.

and what he pays for leather, is in no small degree attributable to the faults which have presented themselves to the tanner.

Farmers, station-owners and country butchers, supply about one-third of the hides and skins reaching the city skin stores, and it is all-important that they should arrive in the best possible condition, so that the tanner may get the greatest quantity of good leather from them. Country suppliers of the raw material are, as a rule, large users of leather goods for harness and general farm purposes, as well as for boots and shoes, so that both as a seller of hides, and as buyers of leather, they are directly affected, and doubly interested.

Country hides are for the most part ripped off carelessly, without regard to final shapeliness, and often very little attempt is made to cure them, or preserve them in any way.

Generally the farmer sells to dealers, who collect from all sources in the country districts and forward consignments to the city stores. Occasionally the dealer sells them in country centres where they are detained and later on consigned with others to a hide merchant. Thus it may happen that a considerable time will elapse before hides eventually reach the tanner. Owing to insufficient curing, country hides frequently arrive in a condition known as "slippy," and are more or less putrid, and very little good leather can be manufactured from them.

DAMAGE BY BRANDING.

The methods at present employed for identification of cattle are fire-branding and ear-marking. The fire-branding of cattle is the cause of a tremendous loss to the community generally and the producer in particular.

Mr. W. A. N. Robertson, Chief Veterinary Officer for Victoria, computes the loss on Australian hides due to the damage caused by the present methods of branding to be from 5s. to 7s. 6d. per hide or a total loss of half a million sterling to the stock-owners of Australia.

Unfortunately in fire-branding the marks are generally placed on that portion of the hide from which the best leather could be made, *i.e.*, the ribs or rump of the beast, and thus one or even two square feet of the most valuable part are rendered worthless for making into leather. The ribs and rump portion of the hide becomes, when manufactured into leather, mostly all butt. Butts really are sides of leather with the necks, shoulders, flanks and legs trimmed off. If fire-branding is a necessity, then as far as practicable the brands should be placed on the inferior parts of the hide, say on the neck, cheek, shoulder or flank.

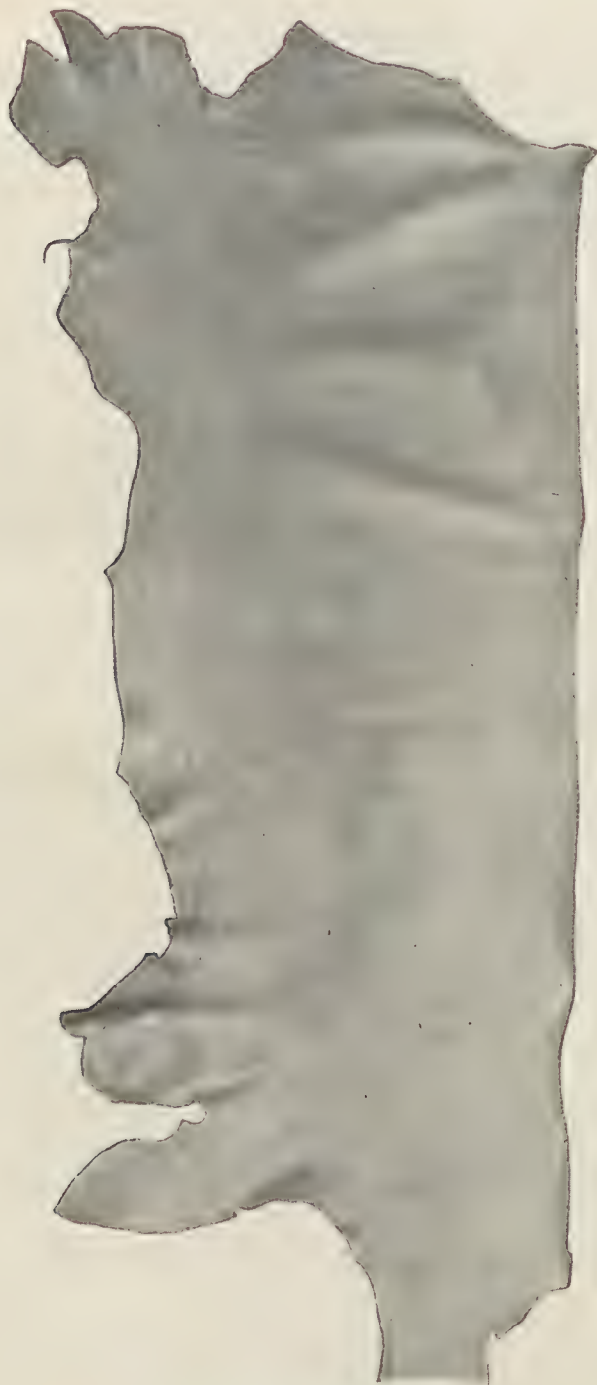
The original calf brand may be comparatively small, but as the animal grows the brand is proportionately increased in size.

Fire brands are occasionally to be seen on both sides of a beast anywhere from neck to rump, and they may have so affected the hide as to be visible on the fleshy side.

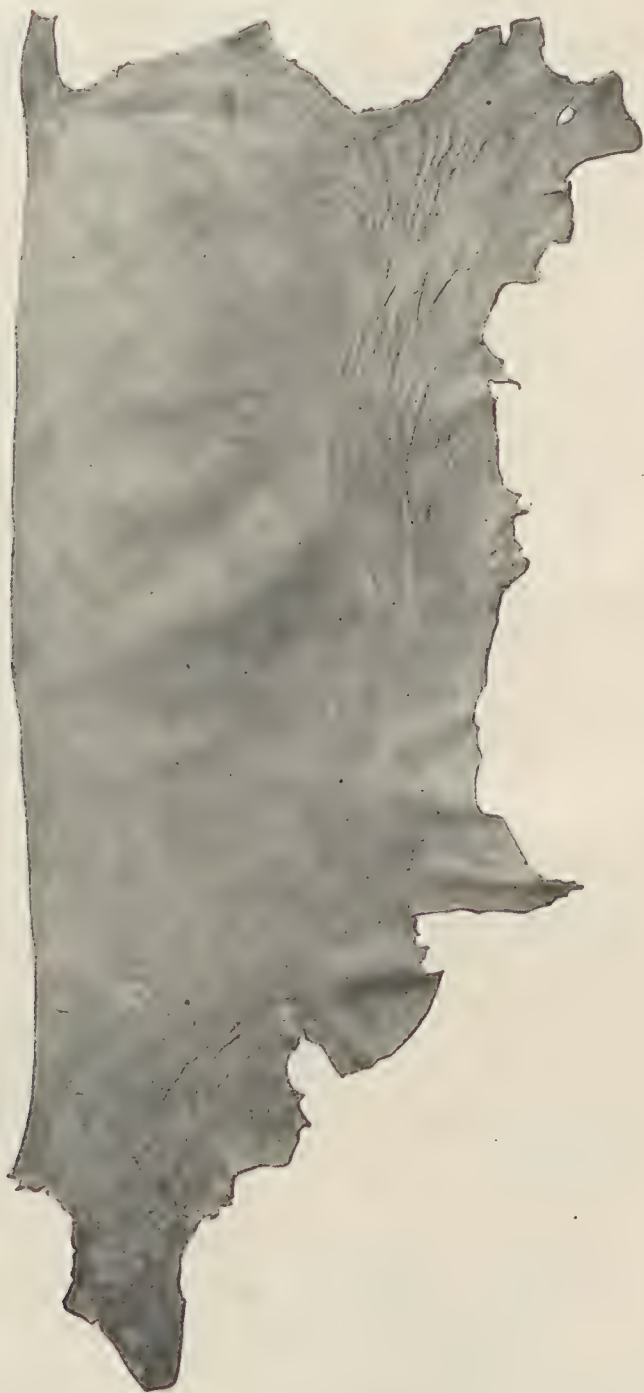
METHOD OF SLAUGHTERING AND SKINNING.

CATTLE.

All animals before slaughter should be thoroughly cooled down and given access to water. Thirsty animals, and those that have been rushed about and slaughtered while hot, are difficult to skin, and cuts, scores and nicks are almost sure to result.



Result of Good Flaying.



Result of Bad Flaying.

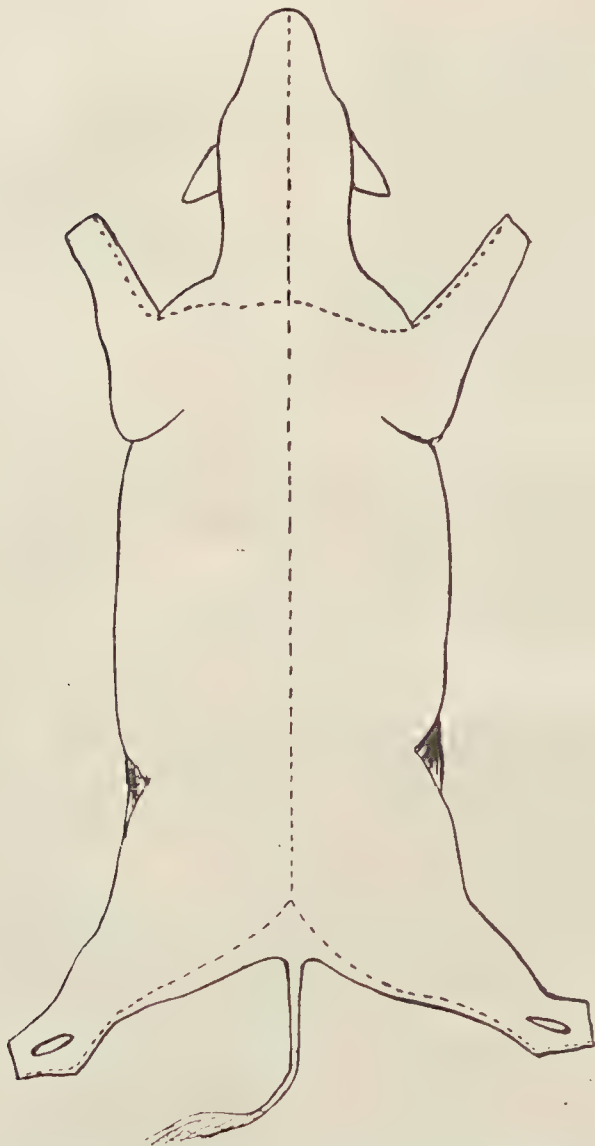


Shape of a Well-flayed Hide.



Shape of a Badly-flayed Hide.

It, of course, goes without saying that the animal should be skinned immediately the kick is out of it after sticking, and by no means allowed to get cold before a commencement is made. If skinned immediately, the hide will come away freely.



The dotted lines indicate the direction to be followed with knife in order to get the best shaped hide.

(Figure is of a beast on its back.)

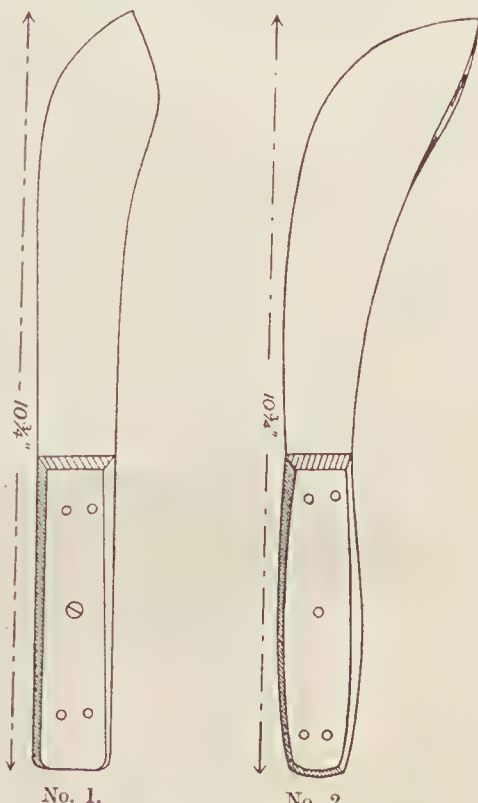
The tools required for the slaughtering operation on farms are two knives, a steel, an American axe, and a saw (either butcher's or carpenter's saw will do). A good straight six or seven-inch bladed

ripping-knife for skinning and ripping, and a slightly curved bladed knife for siding and backing-off are also necessary. The animal should be cleaned free of dirt and manure, and when it is killed the carcass should be brought to a clean place on which to be dressed. After the beast has been felled, either by pithing or by giving it a sudden blow on the forehead, it should be bled. This is accomplished by making a deep incision into the neck. Then a long straight incision must be made from a point half-way between the breast-bone or sternum and throat, severing the skin along the median line for from 9 inches to 1 foot. The wind-pipe will be then exposed; this must be followed down towards the brisket point with the knife, keeping in deep, with the back of the knife on the wind-pipe until the big blood vessels are encountered where they fork, and at that point the artery and large vein may be severed.

If a good stick be made, the animal will bleed remarkably well and quickly. In the case of cattle the neck should never be cut cross-wise. When the carcass has bled freely, the head, cheeks and face should be skinned, and the chin split by extending the "coming-up cut" to the one made in sticking. The horns should be sawn off and the head removed and the neck "scragged."

The beast must then be placed on its back and held in position by means of a short prop known to the trade as a "pritch," or else by placing a block on each side of the carcass. The legs may be cut off at the knee-joints and hocks. The skin may be opened at the knee joints and the knife run in a direct line to the brisket, and in the case of the hind legs from the hock to a point about three inches behind the cod (purse). Next the hide may be opened up from the crutch to the sticking cut in the neck.

The actual skinning process then commences. One of the main factors in flaying well, is to hold the hide up tightly with one hand and drive or thrust the knife with the other, cutting from heel to point. After opening the carcass out on the ground and skinning well down



No. 1.

No. 2.

No. 1.—Knife for pithing, sticking, and opening out the skin from legs, etc.

No. 2.—Class of knife known as a siding knife, and used for making the longer cuts, etc., and strokes in siding and backing off. The siding knife is used mostly on cattle and big calves.

For dressing small calves and sheep two good knives like No. 1 will suffice.

each side, the brisket and aitch are sawn through. It must then be partly raised from the ground by means of the tackle until the tail is about as high as the operator's shoulders. The tail should be removed and about six inches of tail-skin left on the hide. Then proceed to remove or clear the bulk of the hide. Finish around the butts and side to the chine or back bone on each side before completely raising the animal. (The beast is sufficiently raised when neck is just clear of the floor). After removing entrails and chest contents, chop or saw down evenly through the middle of the back-bone from pelvis to neck and wipe the carcass with a clean damp cloth. To do the best work, good tools are required. Proper knives are essential.

Country hides forwarded to market are at present much inferior to those sent by butchers and from abattoirs. At abattoirs only experts are engaged in the flaying process; further, the abattoirs have one advantage in that hides are cleanly handled there and quickly marketed. From the bulk of the metropolitan abattoirs the hides are taken fresh daily, and the curing process, if required, done at the hide and skin stores by qualified men; or else they are sold direct to metropolitan tanners and subjected to the tanning process forthwith. But all the blame for damaged hides must not be assigned to farmers and country butchers. Hides coming from abattoirs often shown signs of scoring or nicking, together with cuts and "cut outs." Expert butchers, of course, can take off the hides perfectly, but the work as done at present being mostly in the form of rush-work, the necessary time cannot be given to perfect flaying.

The method of flaying cattle-hides as conducted at abattoirs lends itself to scoring (partly cutting through the hide). In the process of "grounding" the bullock, a considerable portion of the work is accomplished while the beast is on its back, and while in this position the hide is almost completely taken off the carcass. It is around the region of the buttocks, rump and tail that damage is effected while the beast is on the ground. Most butchers like to "side" the animal and carry the work right around the buttock and even clear to the tail while it is on the ground. The work can be more quickly done while the animal is in this position, but it is often accomplished at the expense of the hide, for it is there that a good deal of nicking and scoring takes place. The work round this part would be done better, as far as the hide is concerned, when the beast is partly hoisted; although the carcass would not be so quickly dressed, the hide would get better treatment and the beef look and be dressed just as well. It may take a little longer time, but in these days when wages for expert slaughtermen are high, time to most butchers is of more value than the loss due to the damage that may be inflicted on the hides.

The treatment by country butchers of the tail end of the beast is frequently at fault. Instead of skinning the tail carefully and well down from the rump to within about 6 inches of the tip, it is often severed back into the rump with all its skin intact. No doubt it keeps fresher looking, and sells better for edible purposes with the skin on, but at what loss! At the expense of the ultimate shape of the hide; for the tanner has to sacrifice some of the most valuable portion of the butt to even up the hole made as the result of cutting off the tail too close.

Country butchers' hides are at times better flayed than those from abattoirs, although improvement can be effected in their flaying. As a rule, however, these hides are not so well cured and are frequently found dirty (carrying dirt, blood, manure, &c.) on reaching the city hide and skin stores.



Method of Opening to Produce Square Hide.

To the abattoir operative and country butcher, little may be said as to the proper method of opening up the carcass to get the best result in the hide as to shape, but the farmer and station-owner require to better their present methods. There is room for improvement in curing also.

In this Journal for June, 1917, attention was drawn to the necessity for changing careless methods. Unshapely hides and skins

with ragged edges which occasionally arrive at city stores in a dirty and putrid condition spell loss to the producer. What should be aimed at is to get the hide from the beast as nearly square as possible, so that the tanner may get the maximum amount of leather with the minimum of loss especially in the way of trimming.

CALF SKINNING.

The animal may be either stunned or "pithed" before sticking. In some cases the head is completely removed as soon as the beast is



Siding Down.

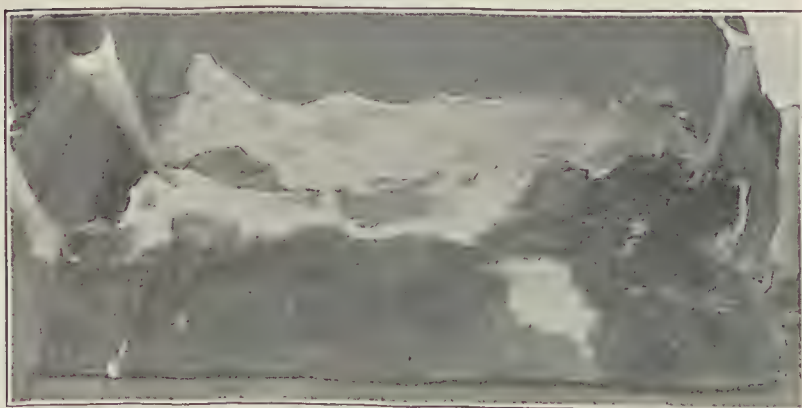
Note way knife and hide are held.

felled. While the carcass is bleeding the ends of the clotted veins and arteries of the neck may be cut once or twice so as to allow the blood to flow more freely. In calf-skinning, it is not necessary to knife off the hide to the same extent as with large cattle. The smaller the calf the less knifing is required. The operation is begun by opening up the legs as in the adult beast, and the skin is, wherever possible, punched off by the fists or by the back of the knife. The knife is necessary to clear the neck and around the legs and flanks and near the base of the

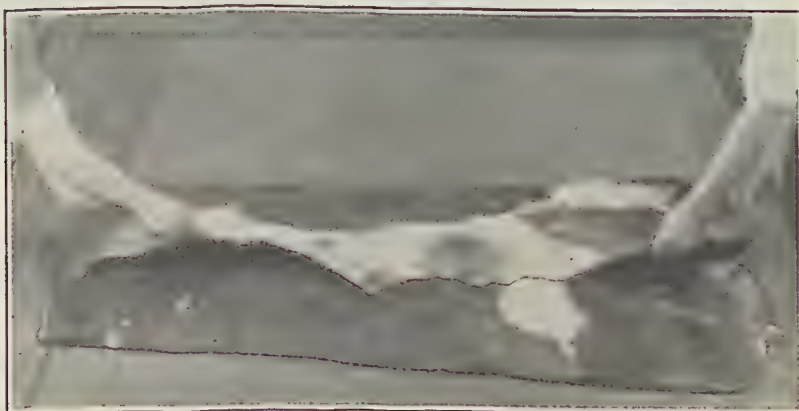
HOW TO FOLD A HIDE.



First Stage.



Second Stage.



Third Stage.

HOW TO FOLD A HIDE.



Fourth Stage.



Fifth Stage.



Sixth Stage.

tail, but the balance may be pulled, and in this way the chances of nicking are minimized. Calf skins score very easily, and by using the knife as little as possible a more valuable skin is almost sure to be obtained.

DRESSING SHEEP.

In the country, sheep and lambs are usually held over a rail on the floor, and stuck alongside the ear, either by pushing the knife right through the skin on both sides of the neck and then turning the knife while in the neck and cutting backwards to the bone, almost severing the head. At abattoirs and country slaughter-houses variations of this method are adopted.

The sheep or lamb is then placed on its back with the four legs turned upwards, and the operator "legs" the animal, that is, he grasps the off fore-leg between his knees and from the knee joint rips down to the neck. This is repeated with the other fore-leg, and little opening out is necessary. Before proceeding further he makes an incision in the neck to free the gullet, in which a knot is tied so that the contents may not escape. The piece of skin overhanging the brisket is next grasped in the left hand, and the right hand and arm pushed up under the brisket skin almost to the cod and forced each side in so doing. The hind-legs are grasped between the operator's knees and the skin ripped down from hock to crutch and opened out slightly. The handle of the knife may be used in forcing the skin away from the opening made in ripping to clear the legs near the tail. The gambrel should then be inserted between the hock joints and the animal ham string and hung on hook. The hook should be just high enough to allow the carcass to hang clear of the floor. An even cut should be made from cod to neck down the length of the skin and the skin "fisted off" wherever possible. A little knifing in the flanks and around the tail is all that is required, and if the animal is sappy, the skin will, when started right, peel off without much effort on the part of the killer.

CURING OF HIDES.

CATTLE.

The hide must be washed clean of blood, dirt, manure, or other *débris*, and allowed to cool. It should be laid out in a clean place and liberally and evenly sprinkled with coarse salt. The quantity necessary is about 12 lbs. per hide. The legs, neck, and edges of the hide require special attention, as they are the first to show the effects of bad salting. If the hide is to be disposed of at once, it should then be folded by throwing the sides over the centre, then the neck and tail end, again folded over, and rolled up into a bundle and tied with thin rope or stout twine. Wire should never be used, as it will eventually stain the hide. Efficient, clean and quick salting is necessary to prevent the hide from turning more or less putrid. Putrefaction causes the hair to fall or slip, and "slippy" hides are frequently not worth tanning.

If it is intended to store the hides to make one large consignment, they should be cleaned, and when the animal heat has escaped, placed in a large shallow concrete pit, the floor of which has been sprinkled with coarse salt. The hide should be laid in the pit fleshy side up and sprinkled evenly with clean coarse salt. The next hide

may be laid on top of the previous one and salted similarly. In the pit the hides make their own brine and become better cured, and will stand a journey to market better than the fresh-salted ones. After being in the pit for a fortnight or longer they may be lifted out to drain. When in twenty-four hours they firm up, they can be rolled and bundled as previously described, and firmly tied with thin rope. Before bundling any superfluous salt should be shaken or swept off.

Another method of treating hides is to place them in pairs, fleshy sides together, after they have been well salted, when they may be bundled and allowed to cure.

If it is intended to keep skins on hand for any length of time, it will be necessary to spray or paint them with an arsenical preparation, in order to prevent the ravages of weevils or other vermin. A satisfactory spray can be made by adding 1 lb. arsenic and 3 lbs. soda to 5 gallons of water, and then boiling the mixture; when dissolved make up to 15 gallons of water. If preferred, arsenate of soda, procurable at most country stores, may be used in the strength of 1 lb. to 5 gallons of water: another preparation can be made in the following way:—Dissolve 1 lb. arsenate of soda in five gallons of cold water; place 1 lb. bitter aloes in 2 gallons of water and boil until the aloes are properly dissolved, and add one pint of the aloes mixture to every five gallons of the arsenate of soda mixture. The spray is then ready for use.

Any preparation should, of course, be painted on the fleshy side of the skin.

CALVES.

Calf skins may be treated and folded in the same way as cattle hides. Two or three or more may be folded together to make a fair-sized bundle and tied firmly with strong twine or thin rope.

SHEEP.

Sheep skins immediately after removal from the carcass should be hung on rails or wire in a cool, draughty, shady place to dry. A large open or louvered shed makes a good drying place. They may be bundled together and sold or forwarded to market as soon as dry.

MARKETING OF HIDES.

Cleanliness is an important factor in obtaining top market values, and often a glance will show why some hides fetch only the lower prices. Dirty hides, due to the use of dirty salt, are too frequently in evidence.

If consignors improved their methods of branding, flaying and curing their hides and skins, city buyers would quickly recognise the fact and pay accordingly.

By the disposal on the farm to country dealers, the hides eventually lose their identity and the careful man is not compensated to the full extent for the care he may have exercised.

Hides and skins may be forwarded in large or small parcels to the various stores and sold on account of consignors. Such consignments should be properly tagged and addressed and information forwarded giving full particulars as to condition, &c., and they will be graded on the consignor's behalf and for sale as described.

Clean, well-cured, good-shaped hides and skins free from scores, cuts, blemishes and slip, will fetch top values. At the stores facilities are given buyers to thoroughly inspect each separate hide if necessary prior to the sale.

THE CITRUS INDUSTRY IN SPAIN.

METHOD OF PACKING.

The following observations on Orange Packing in Spain have been received by the Citriculturist of the Department of Agriculture from Mr. W. Jones-Allen, who is associated with the Airless Storage Company, and who has had a large experience in fruit-marketing in Great Britain and on the Continent:—

The citrus-growing districts of Spain are mostly situated on the east coast of that country, between Barcelona and Malaga. The chief centres for the export of fruit from these districts are Barcelona, Valencia, Burirana and Castellon. From Barcelona to Valencia is a distance of between 80 to 100 miles, and throughout the train journey it is one long line of citrus-growing land, in fact it might be said that it is one vast citrus grove.

In 1920 some 10,000,000 cases of oranges, averaging about 500 oranges to the case, were shipped to London for the European markets; this was exclusive of the fruit shipped by train through France. The main variety of oranges grown in this district is naturally the Valencia, the orange deriving its name from the Province of Valencia. The method of growing is the same to-day as it was when originally laid out. The land is a red sandy loam, the trees are somewhat larger than those of Australia, but the method of growing, irrigating and culture is very much like that now obtaining in Australia; in fact some of the districts remind one very much of Australia. The method of irrigating was originated by the Moors during their occupancy of Spain nearly a thousand years ago. The hills in the back ground provide the gravitation; the water is thus directed to the various districts, and then by very crude channels to the respective orchards. In some places where the country is hilly the land is terraced, and looks very much like a series of platforms on the side of the hills.

The growers, except in isolated cases, do not pack their own fruit; the packers are really merchants, who buy the fruit on the trees and have their own pickers and packers and packing houses. Very crude methods are adopted for transporting the fruit from the orchard to the packing houses, mostly by means of donkeys loaded pannier-fashion. The fruit is then laid out on the floor of the packing house, sometimes four and five feet deep on a layer of straw or hay on the floor of the packing house. According to the state of the weather at the time of picking, the fruit is allowed to sweat from six to fourteen days. It

is then hand-graded by women labour, sorted in the respective grades, wrapped and packed. The method of packing is invariably of the square-pack type. This allows for a current of air around every orange. The packing case has a central division or sometimes two, raised in the shape of a half circle, from three-quarters to one inch higher than the ends of the case. The fruit is packed up on a level to this bulge, so to speak, the lids are nailed at the centre first and then pressed down and nailed at the two ends. This gives a tight pack and allows for shrinkage, as occurs always in the case of citrus.

The two essentials recognised by all packers in Spain are tightness of pack and air circulation. The packing sheds are in some cases very crude and in others very elaborate, depending largely upon the districts in which they are situated, but the method of packing in all is practically the same. So highly skilled have the packers become that the marks on the packs in London denotes how many oranges there are in a case, and this never varies, in fact when the case arrives in the various distributing centres in Great Britain, buyers in the country often do not come to inspect, as they know the packers' marks being sold and will buy them on the name only. This would be a highly satisfactory condition of affairs applied to export packing from Australia, and it would pay the various Associations to concentrate on this highly desirable result.

During a recent visit to California it was observed that the method of packing there is somewhat different from the Spanish; it is the Floradora or diagonal pack. The method used in South Africa is as far as possible to pack with the bulge in the case, the same as the Spanish, and the good carrying of fruit from Africa to London has proved that this bulge has a great effect in retaining the rigidity of the pack by building up the bulge.

The Australian fruit wherever shown has been highly commended for its splendid colour and flavour. It is quite in order to say that the Australian Washington Navel orange is not surpassed in any part of the world.

The writer showed some Australian oranges in Durban and Cape Town and they were much admired. The colour is a great selling feature, and the Australian oranges seem to acquire this better than those of most other countries.

COST OF PACKING.

The extracts hereunder are made from a report received from Mr. W. Lambert White, of the British Consulate at Valencia, Spain, and a member of the firm of White Harker and Company, fruit exporters:

At par 25 pesetas = £1 sterling.

At present rate of exchange, 28 pesetas = £1 sterling.

1 kilo = approximately 2 1-5th lbs. avoirdupois.

ORANGE WRAPPING PAPER.

In Spain the paper is bought by the bale, which contains approximately 15,000 sheets of 20in. x 30in.

The best quality paper weighs about 165 lbs. to the bale.

The best quality paper used here is made at "Onteniente" by the factory "La Clarina."

The present prices (October, 1923), range from 140 to 145 pesetas per bale in Valencia.

These prices of course do not include printing the paper. Printing costs about 35 pesetas in one colour; about 50 pesetas for printing in gold; and about 75 pesetas for printing in gold and one colour.

At present there is a duty of 18 per cent. per 100 kilos on imported paper of this class.

WAGES IN THE ORCHARD.

Men, 5 pesetas per day. Women, 2.50 pesetas per day. Boys, 2.50 pesetas per day.

WAGES IN THE WAREHOUSE.

Female apprentices. From nothing onwards.

Female sorters, 2.15 pesetas per day.

Packers, 2.50 pesetas per day.

Overseer, 2.50 pesetas per day.

Wrappers, 2.25 pesetas per day.

Foreman in packing shed, 5.00 pesetas per day.

Male carpenters, 6.50 pesetas per day.

Male stringers (those that cord the boxes up), 5.00 pesetas per day.

Male carpenters, 6.50 pesetas per day.

Male stringers (those that cord the boxes up) 5.00 pesetas per day.

Male carriers, 4.50 pesetas per day.

The above are the wages that were current during the season 1921-1922.

There will probably be very little, if any, reduction for the present season.

Gross Weights Orange Cases.

					lbs.
420s.	...	...	...	...	130
420s.	Large	...	...	...	160
420s.	Extra large	...	...	...	180
714s.	...	...	...	...	180
1064s.	...	...	...	...	200

Half Cases.

					lbs.
200s.	...	...	...	...	70
200s.	Large	...	...	...	84
200s.	Extra large	...	...	...	104
300s.	...	...	...	...	84
504s.	...	...	...	...	94

NAILS, &c.

Wire nails used in packing are from 15 to 20 gauge. Price per package is from .90 peseta to 1.40 pesetas. (Packages contain approximately 100 nails.)

Wire, which is used by some packers for the fastening of cases, is bought at 115 pesetas per 220 lbs.

Tying cord is bought in bundles of 110 lbs. each. The prices vary according to quality, and ranges from 27 to 33.00 pesetas per bundle.

CASES.

Unfortunately in Spanish packing we do not work with one Standard size case, but have several different sizes.

Until recent years only large cases were shipped, viz: 420s., 714s., 1064s., but now nearly the whole of the trade have gone on to half-cases, which are packed viz: 200s., 300s., 360s., and 504s., oranges to the box.

Below are the measurements of the wood required for making some of sizes of Valencia packages. The end pieces and the centre pieces have a curved top and the measurements given are the outside measurements.

HALF-CASE ORANGES.

(Cost 1 peseta 95 cents.)

200s. Large—

- 2 ends $10 \frac{5}{8}$ in. x $13 \frac{3}{8}$ in., thickness $\frac{11}{16}$ in.
- 1 partition $11 \frac{13}{16}$ in. x $13 \frac{3}{8}$ in., thickness $\frac{11}{16}$ in.
- 2 sides $5 \frac{1}{8}$ in. x $29 \frac{15}{16}$ in., thickness $\frac{3}{8}$ in.
- 2 sides $4 \frac{3}{4}$ in. x $29 \frac{15}{16}$ in., thickness $\frac{3}{8}$ in.
- 4 tops and bottoms $2 \frac{9}{16}$ in. x $31 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.
- 2 tops and bottoms $6 \frac{11}{16}$ in. x $31 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.

504s. Large—

- 2 ends $12 \frac{3}{16}$ in. x $12 \frac{5}{8}$ in., thickness $\frac{11}{16}$ in.
- 2 partitions $13 \frac{3}{8}$ in. x $12 \frac{5}{8}$ in., thickness $\frac{11}{16}$ in.
- 2 sides $5 \frac{3}{4}$ in. x $31 \frac{7}{8}$ in., thickness $\frac{3}{8}$ in.
- 2 sides $5 \frac{5}{16}$ in. x $31 \frac{7}{8}$ in., thickness $\frac{3}{8}$ in.
- 4 tops and bottoms 4 in. x $33 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.
- 2 tops and bottoms $3 \frac{9}{16}$ in. x $33 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.

1064s.—

- 2 ends $14 \frac{3}{16}$ in. x $17 \frac{3}{8}$ in., thickness $\frac{3}{4}$ in.
- 2 partitions $15 \frac{3}{4}$ in. x $17 \frac{3}{8}$ in., thickness $\frac{3}{4}$ in.
- 2 sides $7 \frac{7}{8}$ in. x $43 \frac{5}{16}$ in., thickness $\frac{3}{8}$ - $\frac{13}{32}$ in.
- 2 sides $5 \frac{9}{16}$ in. x $43 \frac{5}{16}$ in., thickness $\frac{3}{8}$ - $\frac{13}{32}$ in.
- 2 tops and bottoms 8 in. x $44 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.
- 4 tops and bottoms 4 in. x $44 \frac{1}{8}$ in., thickness $\frac{5}{16}$ in.

PACKING.

As a rule in the packing house they work in what is known as a "cuadrilla" or gang, and a gang for making 30 half-cases a day would consist of the following:—

Two women, who actually put the oranges in the cases.

Four women, who wrap the oranges.

Two women, who classify the oranges, and one small girl, who is an assistant.

In order to keep these women supplied with sufficient fruit for packing the 30 half-cases they would require the following:—

Three men to pick the oranges.

One foreman.

One man (with horse and cart) to take the oranges from the orchards to the packing sheds.

In addition to the above they would of course require one carpenter.

During the first season when there has to be more care taken in the packing of oranges, one man can pick only about 20 arrobas (approximately 560 lbs. per day).

The average weight of oranges that goes into each half-case is four arrobas (1 cwt.), or for every 2,000 oranges one can pack about five half-cases.

SHADE-GROWN CIGAR LEAF.

The following report on the methods of growing and curing cigar wrapper leaf in Florida has been received from Mr. Temple A. J. Smith, Tobacco Expert of the Department of Agriculture, who some time since went to the United States to inquire into and report upon the methods of tobacco-growing there:—

This industry has reached large proportions in Florida, and is designed to produce cigar wrapper leaf of the Sumatra type. In order to make growing conditions as similar as possible to those of Sumatra, hundreds of acres are closed in with a frame work of wood and wires, over which cheese-cloth is placed. In some cases slats only, placed one inch apart are put on the top so that more sunshine may be admitted and thus a stronger type of leaf produced. The structure is 9 feet high, and the crop, when matured, reaches to the roof. The cheese-cloth covering lasts only two years, and the cost of growing tobacco leaf under these conditions is considerable, being variously estimated at from £80 to £130 per acre.

The average yield is 1,200 lbs. per acre, but the risk from damage by storms is very great, and diseases are causing much loss and anxiety to growers. Recently a disease, known as Black Shank, has thrown many fields out of use, in some cases in the second season after the erection of the shade structure. This disease is spread by the use of infected seed, and no cure has yet been found. Dr. Tisdale, Plant Pathologist for the Government, is investigating the disease, and considers that, by selection, and probably by cross breeding, resistant types may be found. An inspection of his experimental yields suggests that his efforts in this direction seem likely to be crowned with success, as some of his plants have certainly defied the disease while surrounded by plants badly affected.

Dr. Tisdale has had some experience with Blue Mould, in America, and he advised me to try selection of resistant plants to reduce the risks caused by this trouble.

Shade-grown leaf is best suited by a fairly rich, sandy loam soil, which must be well drained and heavily fertilized with a complete fertilizer in the proportion of 8 per cent. phosphoric acid, 4 per cent. potash, and 4 per cent. nitrogen. The plants are put out in rows by hand. In most cases the distance between the rows is from 4 feet to 4 ft. 6 in., and in the rows the plants are placed 18 inches apart.

The land is cultivated every week until the crop is too large to admit machinery, and, as it grows, the leaves have to be tied up to the roof to prevent their falling, owing to the soft nature of the stalks grown under

such conditions. One man is not expected to undertake more than an acre of this tobacco. The growth of the crop is very fast, and from the time of transplanting takes from seventy to ninety days to mature. Many pests, such as the Flea Beetle, Bud Worm, and Horn Worm, have to be contended with. To guard against these, the crop must be sprayed or powdered every two or three days.

When harvested, the leaves are picked singly and taken straight to the barns and strung on twine, and hang-sticks at the rate of thirty leaves per stick of 4 feet in length, and hung on tiers in the barns, where the leaf is cured in three or four weeks. The only artificial heat used is charcoal fires on the floors during excessively wet weather.

After curing is finished, the leaf is packed in boxes and sent to the warehouses to be fermented and graded for market. Most of the larger growers, and companies for whom the crop is grown, have large buildings where the fermentation is done; in these the requisite degree of moisture and temperature can be controlled. The leaf is built up in stacks or bulks of from 2,000 to 4,000 lbs. each, and covered with heavy cloths, and in each bulk is a thermometer which can be examined from time to time. Fermentation may take from three to four weeks, as each bulk is liable to ferment three or four times and is turned and rebuilt when the temperature rises to between 115° and 130° F., according to the type of leaf being treated. Heavy-bodied leaf will stand higher temperatures than light, thin leaf. When fermentation ceases the tobacco is graded and packed in bales of 100 lbs. each, and can then be sent to market.

The average price over ten years for this class of tobacco has been 2s. per lb., and it is difficult to understand why growers continue to take the risks the crop entails for such a poor return, many growers to whom I applied for information told me that if they were not able to have much of the work carried out by their families they could not carry on. Negro labour is fairly cheap, the wage of a man being 5s. per day, and that for women and children still less.

Buildings for this crop cost much money. Barns must be roomy and well closed in. Houses must be provided for employees, and warehouses for fermentation. The estimates given me for establishing a plantation and all necessary buildings, &c., were from £600 to £800 per acre.

The outlook for shade-grown leaf is not good at present, as cigar smoking is not keeping pace with the cigarette and pipe, and it is doubtful whether Australians should attempt to grow leaf under these conditions, at least until prices improve.

A heavy tax is placed upon Sumatra leaf coming into the United States of America, in order to protect growers of Florida leaf, but the cheaper labour and better natural conditions in Sumatra enable growers there to still enter the market here and make better profits than the local producer.

After the termination of the war high prices were paid for Florida cigar-wrapper leaf, and growers who then established plantations have gone on growing from year to year in the hope that prices would again become remunerative, but they are now giving their attention to the production of cigarette tobacco in which the prospects are better.

THE COTTON INDUSTRY IN AMERICA.

The following notes on the Cotton Industry in the province of Greenwood, South Carolina, were made by Mr. Temple A. J. Smith, of the Department of Agriculture, while pursuing his investigations in America in regard to methods of tobacco growing:—

This particular district is known as one of the oldest and best for cotton production in America. I am at present staying with a Mr. W. G. Moore, a large grower, whose family has been raising cotton in this portion of South Carolina since the inception of cotton growing. Mr. Moore has followed the vicissitudes of the industry carefully, and I am fortunate in being able to get information at first-hand from one so experienced and well-informed upon this important subject. I have met many other leading growers, and find all agree in respect to the matter I am now sending you. I have also inspected one of the large cotton mills here, and have talked with several men interested in cotton manufacture.

Just now the growers are experiencing a very bad time owing largely to the attacks of the Boll weevil, which has found its way into this quarter during the last two years, and which has been so destructive as to cause a reduction in area to less than half that of a few years ago, and at the same time a serious decrease in yield per acre. In 1914 Greenwood county produced 34,000 bales of cotton; in 1922, the same county produced only 6,000 bales, and for the falling off farmers do not hesitate to give the Boll weevil full credit.

These results have had a disastrous effect in other respects, one of which has been that the negroes who were growing cotton on the share system have left in large numbers for the northern States to work for wages, which will pay them better. No less than 54,000 have left this State since the 22nd of September of last year. This exodus of labour is not confined to Greenwood, but is general in about the same proportion from all the States in which the Boll weevil has operated. A corresponding slump has taken place in land values, and land in this county, which commanded a value of £12 per acre five years ago, is difficult to sell at £3 to-day. This condition is not hard to understand when it is explained that even where stringent measures are taken to combat the weevil by cultivation and poisoning, which naturally entails more labour and expense, the yield still falls much below that of pre-weevil years, as it appears impossible to absolutely prevent damage by the insect.

Unfortunately this evil is spreading and threatens to kill the cotton industry wherever it appears. Many of the old-established growers have already given up growing the crop, and the opinion here is generally expressed that only men with outside resources can keep on growing in the hope that some solution of the difficulty will be found. I have seen large areas abandoned for cotton, and farmers do not yet appear to have found other profitable uses to which to put the land. It may seem that I am taking too serious a view of the trouble, but I wish to make evident the need for every precaution to keep this pest out of Australia, as I feel sure that if it finds its way in, it will prove a grave menace to the cotton industry there.

The soils here most in favour for cotton are sandy grey loams of medium quality overlying yellow and red clay sub-soils, with good natural drainage. The red soils, which contain more clay, also produce cotton, but are later in maturing the crop, and not so desirable. The rainfall is from 50 to 60 inches per annum, of which about one-third falls during the growing season. Good farmers like to fallow the land a few months before the seeding season, which in this district extends from the beginning of April to the beginning of May.

Heavy fertilizing is the practice. About 400 lbs. of fertilizer made up in the following proportions is applied per acre:—3 per cent. sulphate of ammonia, 8 per cent. acid phosphate, and 3 per cent. potash; this is sown with the seed. The cost of fertilizing is approximately 25s. per acre. The land is laid off into rows 3 feet or $3\frac{1}{2}$ feet apart, and a ridge thrown up about 7 inches high, in which the fertilizer is deposited and the seed is sown 1 to 2 inches deep, and from 1 ft. 6 in. to 2 feet in the rows. Shallow sowing is said to be best. When the plants attain a height of 7 or 8 inches the land is well worked with cultivators, and finally ploughed towards the rows of plants. When the plants form the square (which is the portion on which the buds come), if weevils are feared, each square is treated to a poison mixture made up by mixing 1 lb. of calcium arsenite with one gallon of water and one gallon of cheap molasses. This is applied by dipping a small mop (which can be easily made on the farm by tying hessian or tow on a short handle, say, 1 foot in length). The mop is dipped in the mixture and brushed on to the squares. Should rain wash this application off, the whole field must be gone over again, especially if Boll weevils are known to be present. Later, if weevils are still prevalent a dust gun is used to blow the powder on to the plant. The land is kept clean by cultivator and hand-hoes during the whole period of growth.

Picking commences early in September, and lasts till the end of October in this district. The average quantity picked per man is about 125 lbs. of seed cotton. It takes from 1,200 to 1,500 lbs. of seed cotton to make one bale of lint of 500 lbs., and a good crop will yield about this quantity, though the average now is nearer half a bale per acre. The cost of picking is 3s. per 100 lbs. of seed cotton, but most of the picking is done by families who grow the crop on the share system. After picking, the cotton is taken in sacks to the ginning plants, and after removal of the seed the lint is put in sacks ready for sale to the manufacturer. The cost of preparation is 16s. per bale.

The seed sells at from 4s. to 6s. per bushel of 30 lbs., and cotton at 1s. 3d. per lb., at which prices the grower is facing a losing proposition. The usual wage for labour is £6 per month, but very little cotton is grown on the wage system. Negroes and their families grow on shares. The area usually undertaken by one man is from 16 to 20 acres, and some assistance to hoe and pick the crop is required. Over 90 per cent. of the cotton produced is grown on the share system, the landlord providing the land, mules, houses, seed, and half the fertilizer; he also, in most cases, provides rations for his negroes, which, however, are paid for out of the tenant's share of the crop. The tenant does all the work of ploughing and cultivation, undertakes the general care of the crop, and pays his share of the cost of fertilizers, and landlord and

tenant each take half the proceeds. In some cases the land is let to a tenant who pays one-fourth of the crop as rent.

The amount of seed sown here is 1 bushel per acre, and the favourite variety is Cleveland Big Boll, which is said to be an early ripener and good yielder. There is also a variety known as Dixie Wilt Resistant, which, it is claimed, is not affected by wilt.

People interested in cotton culture predict a short crop in the States this season, and, so far as I can learn, Texas is making a better crop than any of the others. The season in many places has been unsuitable. Present prices are not sufficient to tempt growers to plant larger areas, and it is freely stated that any price under 1s. 3d. per lb. will not leave a margin of profit to farmer. Labour is difficult to obtain, and altogether the outlook in this State for cotton culture is certainly not good.

POULTRY FEEDING TESTS.

By W. C. Rugg and W. O. Pederick.

The following are the particulars of feed tests now being conducted at the State Research Farm, Werribee. They commenced 1st April, 1923, and will conclude 31st March, 1924.

For the purpose of the tests 108 white Leghorn pullets were selected and divided into three pens of 36 birds each. None of those chosen was bred from a single mating, the object being to test only birds of such quality as may be found in an ordinary farm flock. All are housed and treated in exactly the same way except for the feed given.

No. 1—Free Choice Pen.—These birds have all the foods in different hoppers always available, and a wire basket is kept filled with green stuff.

No. 2—Dry Mash Pen.—There is a dry mash hopper always open in this pen. Chaffed green stuff is fed to these birds at midday and grain in the litter at night.

No. 3—Wet Mash Pen.—The birds are fed with a wet mash in the morning; chaffed green stuff is given at midday, and grain is fed in the litter at night.

The total quantities of food consumed, and the number of eggs laid by each pen, is set out below. A detailed statement is given on the next page.

Pen.	Mash.	Grain.	Total.	Number of Eggs.
	lbs.	lbs.	lbs.	
Free Choice	308½	1,245¾	1,554¼	3,586
Dry Mash	538¾	1,040½	1,579¼	3,386
Wet Mash	642	953½	1,595½	3,545

DETAILS OF FOOD CONSUMED AND EGGS LAID.

Pen.	Month.	Bran.	Pollard.	Oaten Pollard.	Barley Pollard.	Meat Meal.	Rape Seed Meal.	Oats.	Wheat.	Barley.	Maize.	Eggs.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Free Choice	April	12	25	$\frac{1}{2}$	$\frac{1}{2}$	..	..	41 $\frac{1}{2}$	72	24 $\frac{3}{4}$	17	419
"	May	13 $\frac{1}{2}$	20	..	..	..	..	32 $\frac{1}{2}$	96 $\frac{3}{4}$	21 $\frac{3}{4}$	26 $\frac{1}{2}$	329
"	June	11 $\frac{1}{2}$	9 $\frac{1}{2}$	..	2	21 $\frac{1}{2}$	..	48	54	14	37 $\frac{1}{2}$	292
"	July	12 $\frac{1}{2}$	10 $\frac{1}{2}$	3 $\frac{1}{2}$	..	11 $\frac{1}{2}$	..	22 $\frac{3}{4}$	94	11 $\frac{1}{4}$	51 $\frac{1}{4}$	434
"	August	14 $\frac{1}{2}$	9 $\frac{1}{2}$	..	..	8	2 $\frac{1}{2}$	30 $\frac{1}{2}$	96 $\frac{3}{4}$	24 $\frac{1}{2}$	25 $\frac{1}{2}$	669
"	September	16 $\frac{1}{2}$	16 $\frac{1}{2}$	12 $\frac{1}{4}$	3	5 $\frac{1}{2}$	1	41 $\frac{1}{2}$	108 $\frac{1}{2}$	25 $\frac{1}{2}$	33 $\frac{1}{2}$	700
"	October	23 $\frac{1}{2}$	19 $\frac{1}{4}$	17 $\frac{1}{4}$	1 $\frac{1}{4}$	8	1 $\frac{1}{2}$	50 $\frac{1}{2}$	103 $\frac{1}{2}$	14	27	743
		104 $\frac{1}{2}$	111 $\frac{1}{4}$	43 $\frac{1}{2}$	8 $\frac{1}{2}$	35 $\frac{1}{2}$	5	266	625 $\frac{1}{2}$	135 $\frac{1}{2}$	218 $\frac{1}{2}$	3,586
Dry Mash	April	14	23 $\frac{1}{2}$	..	..	3 $\frac{3}{4}$	..	18 $\frac{1}{2}$	83	18 $\frac{1}{2}$	..	281
"	May	13 $\frac{3}{4}$	22 $\frac{1}{2}$	..	..	3 $\frac{3}{4}$	..	22	108	22	..	287
"	June	15 $\frac{1}{2}$	31 $\frac{1}{2}$	..	..	5 $\frac{1}{2}$	..	25	109	..	18 $\frac{1}{2}$	230
"	July	25 $\frac{3}{4}$	43 $\frac{1}{2}$	..	..	10 $\frac{1}{2}$	..	35	111	..	10	387
"	August	34	57	..	..	11 $\frac{1}{2}$	2 $\frac{1}{2}$	28	99	..	28	704
"	September	33 $\frac{1}{2}$	56 $\frac{1}{2}$	..	..	9 $\frac{1}{2}$	4	27	96	..	27	748
"	October	37 $\frac{1}{4}$	61 $\frac{1}{2}$	..	..	12 $\frac{1}{2}$	3 $\frac{3}{4}$	26	103	26	..	749
		174	297 $\frac{1}{2}$	..	..	57	10 $\frac{1}{4}$	181 $\frac{1}{2}$	709	66 $\frac{1}{2}$	83 $\frac{1}{2}$	3,386
Wet Mash	April	25	40	..	..	4 $\frac{1}{2}$	..	19 $\frac{1}{2}$	88	19 $\frac{1}{2}$	..	398
"	May	29 $\frac{1}{2}$	49	..	..	10 $\frac{1}{2}$	..	20	96	20	..	372
"	June	30	48	..	..	13 $\frac{3}{8}$	..	20	88	..	14 $\frac{3}{8}$	256
"	July	30	50	..	..	16	..	30	95	..	9	419
"	August	32	52	..	..	20	..	25	90	..	25 $\frac{1}{2}$	623
"	September	27 $\frac{1}{2}$	45 $\frac{1}{2}$	..	..	20	..	26	92 $\frac{1}{2}$	..	26	702
"	October	27	54	..	..	18	..	24 $\frac{1}{2}$	100	24 $\frac{1}{2}$	..	775
		201	338 $\frac{1}{2}$	..	..	102 $\frac{1}{2}$	..	165	649 $\frac{1}{2}$	64	75	3,545

OIDIUM OF THE VINE.

Uncinula Spiral (Berkley & Cooke).

By *Francois de Castella*, Government Viticulturist, and *C. C. Brittlebank*, Vegetable Pathologist.

(Continued from page 685.)

OTHER EFFECTS OF SULPHURING.

In addition to its fungicide action on *Oidium*, sulphur acts in several other ways, some of which are highly advantageous and others distinctly the reverse. Chief among the former are a beneficial stimulating action on the vegetation of the vine; a marked effect on the blossom, resulting in an improved setting of the fruit; and earlier maturity of the grapes. On the other hand, sulphuring, unless judiciously applied, may lead to burning or scalding of the green vine tissues, to injury to the workmen's eyes, or to the development of a very undesirable taste in the resulting wine.

Beneficial Effect of Sulphuring.—It has long been recognised that, apart altogether from *Oidium* suppression, sulphur exerts a marked influence on vegetation: it seems to act as a tonic, increasing vigour and giving sulphured vines a darker green and more generally healthy appearance than those not so treated. Sixty years have elapsed since Marès wrote—

Of all innovations in vine culture the methodical and periodical use of sulphur powder . . . is the most considerable that has yet been devised and accepted in practice. Its influence on vineyard yields is decisive. Up to the present it has had for result a considerable increase in production. Combined with thorough cultivation and manuring, vineyard yields have become both more regular and more abundant. The vegetation of sulphured vines is more brilliant; their fruiting is less exposed to the ravages of *coulure*.*

Sulphur hastens ripening in a very remarkable way. Thus, since sulphuring has been adopted in Hérault,† the vintages have become much earlier. Previously they scarcely commenced before the 20th to 25th September. Since (sulphuring) they begin from the 1st to the 12th of the same month. . . .

Marès goes so far as to say—

The advantages of sulphur application are such that its use in the vineyards would persist independently of *Oidium*. . . .

He concludes that—

The appearance of *Oidium*, which caused such lively alarm to viticulture, has really been, through the acquisition of sulphuring, the occasion of the most notable progress made by it for a long time, and instead of ruin, such as was feared, *Oidium* became for it a cause of prosperity and improvement.

Later authorities generally confirm these views. Foex, though he does not go quite so far, expresses a similar opinion—

Sulphur does not only act as a means of freeing the vine from *Erysiphe*,‡ it seems besides to exert a remarkable effect on vegetation: a week after the operation a sulphured vineyard shows very marked verdure and vigour, as compared with one that has received no treatment. Is this effect, due to direct action of sulphur on the leaf, analogous to that exercised by iron sulphate on the green parts of plants? This point has not been settled, but it seems probable.”§

* Faulty setting of the blossom.

† The leading wine growing department of France.

‡ The older name for the *Oidium* fungus.

§ G. Foex: *Cours Complet de Viticulture*, p. 421

The above quotations, if somewhat lengthy, seem warranted. They will remind practical growers of an aspect of the sulphuring question, which seems to be too little recognised in this State.

The beneficial effect on the blossoming of the vine is even more generally recognised. Bioletti,* after mentioning the tonic action described above, says—

The favorable influence of sulphuring the vines, while in blossom, on the setting of the fruit is even more generally recognised. If *Oidium* is present, this is easily accounted for by the prevention of the action of the fungus on the blossoms. The effect, however, is noticed even when no *Oidium* exists in the vineyard. The tendency of many varieties to "*coulure*"—dropping their blossoms without setting—can be lessened by vigorous sulphuring during the blossoming period. Whether this is due to a stimulation of the floral organs under the action of the sulphur, to the destruction of unrecognised fungi on the blossoms, or merely to the mechanical action of the current of air produced by the blowers in promoting pollination, has never been determined.

The manner in which sulphur stimulates the vine is not clear. Incorporating this element in certain soils has an apparently manurial action and increases fertility.† Its action on the foliage, &c., seems to be of a different order. Does it act by increasing transpiration, thus causing the vine to absorb more soil solution, and consequently more plant food? Such has been suggested to explain a somewhat similar stimulation by copper sprays.

In many parts of the State the vines are not sulphured at all. In view of the above, we are probably unwise in confining the sulphuring of our vines to seasons when *Oidium*, by its presence, compels us to apply it. Sulphuring as a regular part of the yearly cycle of vineyard work—*Oidium* or no *Oidium*—would probably pay handsomely for its application, solely owing to its tonic action. If thus applied, blossoming would be the most opportune moment, though a later sulphuring might be useful in cases where an advance in the date of ripening is desired.

Vine-scald due to sulphuring.—Sulphuring in very hot weather may cause scalding of the green vine tissues—leaves, young bunches, &c. In severe cases some of these may even be so badly affected as to fall off. When the grapes are about half grown, the hardening of the skin preventing normal expansion, the berries may split or be distorted; if nearly ripe, brown purple blotches are caused on the side facing the sun; in either case the fruit is spoiled, especially for table and drying purposes. It is chiefly in a heat wave that injury of this kind is caused—according to Bioletti, damage only occurs at temperatures in the neighbourhood of 110 deg. F., or with very susceptible varieties sorts. Vinifera varieties stand sulphur well, but some American species and their hybrids cannot tolerate it, notably some direct producers such as *Othello*, Nos. 112, 903, &c., which are sometimes said in France to fear sulphur more than *Oidium*.

When scalding is feared it has been recommended to apply sulphur to the soil or to the crown of the vine. Concerning the former, Bioletti says—

Practice has shown that sulphur placed in this position (on the soil) has almost no effect on the *Oidium* except in exceedingly hot weather. . . . In

* *Oidium or Powdery Mildew of the Vine*, by Frederic T. Bioletti, p. 329:—University of California Publications, Bulletin No. 186.

† See *Journal* for May, 1914, p. 289. Sulphur in the soil increases fertility by rendering nitrification more active. It thus has a positive, though indirect, manurial effect in soils which contain sufficient organic matter.

exceptional cases, as, for instance, where very vigorous vines are growing in very moist places in the irrigated regions, or when unusual hot weather occurs in the coast regions, the air may be moist enough for the growth of Oidium even when the temperature rises to considerably above 100° F. In such cases it is sometimes desirable to sprinkle the sulphur on the ground instead of on the vine.

In very hot weather it is well to suspend sulphuring during the hottest part of the day, limiting its application to early morning and evening. It is, however, obvious that in really hot weather sulphuring is almost superfluous. At 104 deg. F. the temperature alone destroys Oidium, especially if the air be dry.

The kind of sulphur used is of great importance; some sorts scald worse than others. Sublimed sulphur (flowers), owing to the free sulphuric acid it contains, is more severe than ground sulphur. The addition of a little lime, by neutralizing the acid, considerably reduces the liability to scald. Likewise, the admixture of plaster (gypsum) or other inert substances to dilute the sulphur; the mixtures of this kind, described below, are less liable to scald than pure sulphur.

The kind of sulphuring appliance used is also a factor of importance; those which distribute thinly and evenly expose to much less scalding. Uneven distribution, on the contrary, aggravates it; the patches receiving too much sulphur, of course, suffer most.

Injury to the Workmen's Eyes.—This depends largely on the sulphur distributor and the kind of sulphur; the hessian bag method of application gives most trouble. The kind of sulphur is of even greater importance. Sublimed sulphur, owing to its free acid, is much worse than the ground form; the addition of lime corrects this defect by neutralizing the acid.

Should the eyes become inflamed the remedy is simple: a solution of soda bi-carbonate (baking soda) at the rate of a small teaspoonful to a large tumbler of water, applied with an eye-bath, gives immediate relief.

The "Sulphur Taste" in Wine.—Sulphuring too short a time before vintage exposes the wine to incur this unpleasant taint; the sulphur introduced with the grapes into the fermenting vat produces, owing to the reducing action of the yeast, sulphuretted hydrogen, with its well-known taste and smell of rotten eggs. If sulphur must be applied shortly before vintage, it is well that it should be in diluted form and thinly distributed by means of an efficient machine.

THE DIFFERENT KINDS OF SULPHUR.

The sulphurs which may be used for Oidium control differ enormously in their efficiency. Much of that obtainable locally is of little use for the purpose owing to its being in too coarse a powder. Fineness of particles is the first essential; it is, as a matter of fact, of more vital importance than purity. A sulphur containing even a large proportion of impurities, but in fine dust, is of far more use than chemically pure sulphur in too coarse a powder. The importance of extreme fineness is obvious; without it a powder cannot be expected to adhere. Sand sprinkled on the vine foliage immediately falls off on to the ground; a powder such as lime or flour largely adheres to the leaves; whilst an impalpable powder such as road dust adheres in a remarkable manner.

The finer the sulphur the further will it go; in other words, the bigger the vineyard area that can be treated by a given weight.

"The fine sulphurs are superior in three important respects:—(1) They are capable of more perfect distribution; (2) they offer a larger surface to the air, and, therefore, give off more fumes; (3) they adhere better to the leaves.

A pound of very fine sublimed sulphur . . . the particles which measure .01 mm. in diameter, if evenly distributed and none lost, would give about 15,000 particles for every square inch of leaf and cane surface on an acre of large vines. A pound of a very coarse sulphur . . . , the particles of which have twenty-five times as large a diameter, would supply only about one particle for every square inch. Moreover, a much larger proportion of the coarse sulphur would be lost by failing to adhere to the leaves and falling to the ground. Perhaps the most important advantage of the finest sulphur in this respect is that the impalpable powder floats so lightly in the air that it reaches and adheres to the lower surfaces of the leaves and canes."*

Sulphur in powder is obtainable in three main forms, viz:—

- (a) *Ground sulphur*, consisting of ordinary bar or lump sulphur, ground to a more or less fine powder.
- (b) *Sublimed sulphur* or *flowers of sulphur*, obtained commercially by passing sulphur vapour into large masonry chambers where it condenses in minute flakes like snow.
- (c) *Precipitated sulphur* or *milk of sulphur*, such as is obtained by decomposing the sulphides of soda, lime, &c., dissolved in water, by the addition of an acid.

Concerning the respective merits of ground and sublimed sulphur, much has been written. Provided the particles are of equal fineness there is little difference in efficiency. In shape the particles differ a good deal; those of ground sulphur are angular like broken road metal on a very small scale; those of sublimed sulphur are practically spherical and covered with minute warty protuberances; several of these small globules adhere together to form chains or flakes; they may, on a very minute scale, be compared to the yellow balls of wattle blossom pulled off the stalks. Sublimed sulphur is generally considered rather less adherent than ground sulphur of equal fineness, the angular nature of which gives it a better hold to the vine surface. Sublimed sulphur varies a good deal in fineness. In the best samples the concretions are small, light, and feathery, adhering well. Inferior samples, resulting from insufficiently rapid cooling of the vapour, are coarser grained and contain many large globular concretions composed of smaller grains agglutinated by heat; these fail to adhere to the vine, and are useless.

If sublimed sulphur is generally preferred, it is because the other is usually too coarsely ground; it is, however, quite possible to mill it as fine as the best flowers, to which it is then quite equal.

The colour of ground sulphur is a good indication of its state of division. Sublimed sulphur varies little in this respect, being of the well-known bright yellow colour. With ground sulphur, on the contrary, the finer it is the paler it is. A very pale colour is thus an indication of quality, provided it is not due to adulteration. Ground sulphur of as bright a yellow as the sublimed form is too coarse for vineyard use.

The two forms are easily distinguished from each other under the microscope, or even with a strong magnifying glass.

Sublimed sulphur is always acid; it contains a small quantity of free sulphuric acid—usually from one and a half to three parts per 1,000

* Bicletti, *ibid.*

of the weight of sulphur—this is due to the oxidation of sulphur dioxide resulting from the combustion of a small proportion of the sulphur, which always occurs during distillation. The presence of this acid war at one time held to give sublimed sulphur a superiority over the ground form; it was even considered, in some quarters, that the emanations fatal to *Oidium* consisted largely of sulphurous and sulphuric acids resulting from the slow oxidation of the sulphur. Such views, however, are incorrect (see page 683). The presence of this free acid is not only useless, but it presents several serious drawbacks. In addition to scalding the vine and irritating the workmen's eyes, as already described, it is very severe on the implements used to apply the sulphur as well as on the bags used to contain it.

Sublimed and ground sulphur differ considerably in chemical nature. The former consists of granules of insoluble or electro-positive sulphur, enclosing electro-negative or soluble sulphur, the proportion of the former varying from 18 to 30 per cent. Ground sulphur consists almost entirely of soluble sulphur; it only contains from 2 to 5 per cent. insoluble.* Whether or not these show differences in the emanations they give off on the vine does not seem clear. Electro-positive sulphur seems to oxidize more easily than the electro-negative form. The emanations yielded by ground sulphur are in any case ample, and the two forms are generally admitted to be equally effective provided they are of equal fineness. The great bulk of the sulphur used in France is in the ground form.

Precipitated Sulphur or Milk of Sulphur.—If a strong acid be added to a solution of sulphides of lime, soda, &c., the sulphur is precipitated in an almost impalpable powder and in the electro-negative or soluble form (same as ground sulphur). Sulphur is similarly precipitated in a more or less impure form as a by-product of several chemical industries. Though not widely used for vineyard sulphuring, this form should show marked superiority owing to its extreme division. Pacottet† mentions having examined samples ten times finer than flowers of sulphur, and as adherent as talc; he expresses regret that this form is not produced more abundantly. Precipitated sulphurs are rather apt to form into lumps; these, however, are readily pulverized by the feed mechanism of most sulphuring appliances. The products known to the trade as "Atomized" and "Atomic" sulphurs, &c., are of this type. Being in the form of paste they are only suitable for making up liquid sprays (see later).

SULPHUR EXAMINATION.

Purity of sulphur is easily tested by burning a small quantity on a piece of broken china plate; it is well to heat over a spirit lamp or stove, to assist combustion. If pure the sulphur burns away altogether; if impurities are present they remain as a solid residue. Though absolute purity is not essential for efficiency, the deliberate addition of foreign substances constitutes a fraud, unless stated in the invoice; the buyer pays for sulphur, not for inert substances. Sublimed sulphur should

* Sulphur presents the peculiarity, not uncommon among elementary substances, of existing under several distinct allotropic forms. The most important are that in octahedral crystals, that in prismatic crystals, and an amorphous form. Both crystalline forms are electro-negative and soluble in carbon bi-sulphide. Amorphous sulphur is electro-positive and insoluble in carbon bi-sulphide. The three forms differ in specific gravity and in melting points. The octahedral form is the most stable, and the one to which all the others ultimately revert.

† Pacottet 2—*Viticulture*, p. 363.

always be pure, ground sulphur usually leaves a slight residue on burning.

Fineness of particles can be ascertained in various ways. With ground sulphur, if pure or nearly so, colour is a good indication—the paler the finer. Sublimed sulphur does not vary in this way.

Rubbing between finger and thumb enables a practised person to form a fair idea of quality, but the “feel” is different with sublimed or ground sulphur. That of the former is soft and velvety like flour—almost greasy; it slips under the fingers and crackles slightly if a small quantity be squeezed. Ground sulphur is less slippery, but crackles more; though distinctly more gritty than sublimed, it should not be so to such an extent as to indicate the presence of large particles.

Microscopic examination gives an excellent idea of the size of the particles, and permits of rapidly distinguishing sublimed from ground; mixtures of the two forms are sometimes met with. In some cases particles of very different sizes are mixed together; the presence of a large proportion of coarse particles much reduces value for vineyard purposes; these being incapable of adhering to the vine, constitute so much useless matter. In the absence of a microscope a strong magnifying glass (10 to 20 diameters) gives useful indications; to examine more conveniently, place a minute quantity on a glass plate and spread by wetting with a drop of methylated spirit.

The weight of a given volume of sulphur varies very considerably with its fineness; the finer it is, the more bulky. If several sulphurs are in sacks of equal weight the largest sack will contain the finest sulphur. A 110-lb. sack of good flowers of sulphur is twice as large as a 110-lb. sack of very coarse ground. (Bioletti.)

The Chancel test is a very convenient way of rapidly determining the collective value of a sample; it is based on the bulkiness of fine sulphur. Before applying it the purity of the sulphur should be tried by burning, since the presence of foreign substances interferes with accuracy.

The chancel tube is a narrow trial jar of 25 cc. capacity divided into 100 divisions. Five grammes of sulphur are weighed and gradually tipped into the tube, with the addition, in two or three lots, of ordinary ether, which wets it well, penetrating all the interstices. The tube is then closed with the thumb, well shaken, and allowed to rest so that settling may take place. More time is required for ground than for sublimed sulphurs. By reading the number of divisions occupied by the sulphur an idea can be formed of the relative fineness of different powders. Good commercial flowers of sulphur occupy 50 to 70 divisions of the chancel tube, those of superior quality 75 to 90, the finest ground sulphur 60 to 70, and ordinary samples 43 divisions.

It is possible to have sulphurs ground and bolted (sifted) to a state of fineness, which, though not equal to that of flowers, is sufficient, and as they are less costly and present some secondary advantages, there should be no hesitation about giving them preference.*

MIXING OTHER SUBSTANCES WITH SULPHUR.

In order to insure even distribution it is necessary to apply much more sulphur than is really needed to control Oidium; lighter dustings, however, would result in its being only applied here and there, leaving large patches untreated and, therefore, unprotected. Mixing the sulphur with inert substances of little value overcomes this difficulty:

* P. Viala :—*Les Maladies de la Vigne*, p. 53.

the much reduced price of the mixture permits more lavish application such as will insure perfect distribution, whilst the sulphur particles are deposited quite closely enough for efficiency. At Apt, in Department Vaucluse (France), deposits occur consisting of gypsum mixed with sulphur, the proportion of the latter being about 20 per cent. This substance, ground to a fine powder, is much used in French vineyards under the name of *soufre d'Apt* (Apt sulphur). According to Viala, Apt sulphur, applied twice as plentifully as pure sulphur, is almost as effective, whilst it reduces the cost of treatment to one quarter. He considers Apt sulphur specially suited for later applications, when the vines have grown to large size. For the first and second treatment (blossom) he advises pure sulphur. The later applications being those which demand most sulphur, it is in connexion with them that economy is most advantageous.

In addition to the obvious economy, diluted sulphurs, such as the above, present other advantages of importance; they do not scald or burn in hot weather to the same extent as pure sulphur; they spare the eyes of the workmen; they are more easily distributed from bellows or dusters, which they do not clog; and, lastly, they are less liable to communicate a bad taste to the wine. Mixtures of this kind, both natural and artificial, have been extensively used in France for over half-a-century. They were strongly recommended by Marès nearly sixty years ago; his formula consisted of 34 parts pure sulphur, mixed with 66 parts of roasted plaster (gypsum) or of ashes. Various proprietary mixtures are largely used in Europe to-day; they are sold under different trade names; also as black sulphur, green sulphur, &c. One such was rather extensively sold in this State some years ago under the name of "Par-oidium." Some of these are mixtures of sulphur and charcoal, others seem to be finely-ground iron pyrites, which, of course, contains much sulphur. Most of them are in exceedingly fine powder, and therefore convenient and economical to apply. Provided they contain sufficient sulphur—say, 40 or 50 per cent.—they may, owing to their fineness, prove more effective than the very coarse though possibly pure sulphur often supplied in Australia. It is well to only purchase brands which are above suspicion; the guaranteed sulphur content should also be stated on the container, as there is strong temptation for this to be unduly reduced by unscrupulous manufacturers.

Mixed powders containing sulphur together with about 10 per cent. of copper sulphate are largely used in France for the combined treatment of Oidium and Downy Mildew, &c. They are of value to supplement copper sprays in cases where Oidium has to be treated concurrently with Downy Mildew. For further details concerning these, see Bulletin No. 49 on Downy Mildew.

MIXING LIME WITH SULPHUR.

The practice of mixing lime with sulphur is of more recent date than the above mixtures. It is true that dry dustings of lime and sulphur were recommended in most French text-books of thirty years ago for the summer treatment of anthracnose; they have since been discarded (see Bulletin No. 42, page 27), but for Oidium control such mixtures seem highly desirable. In France, indeed, lime seems, of recent years, to be largely taking the place of the plaster or ashes recommended by

Marès as a diluent for sulphur. It is true that in that country, sulphur has, for many years past, been so cheap and of such good quality that there was little need to dilute it on the score of economy. During the late war, however, sulphur became so dear that its more economical use was a live question. Professor Degrully,* discussing it in 1916, quotes E Combemale§ who, in 1903, described how he had completely protected his vineyard from *Oidium* during the previous six years with four applications per year, of a powder composed of—

Ground sulphur ...	...	...	50 parts.
Freshly slaked lime ...	...	..	25 „
Cupric steatite† ...	...	...	25 „
			100. „

The third component served to render the powder effective against Downy Mildew as well as *Oidium*.

Several other writers mention as being quite as effective as pure sulphur, mixtures containing from 35 to 50 per cent. of lime. In some of these, part of the lime (usually 10 per cent. of the total weight of the mixture) is replaced by copper sulphate, for reasons explained above. Cadoret,‡ indeed, considers that the addition of lime increases the action of the sulphur; he describes remarkable results obtained with such mixtures in Department Hautes Alpes, where *Oidium* outbreaks are of unusual severity.

M. Thesmar,** President of the Syndicat Agricole of Tlemcen (Algeria), writes, "The best way to economise sulphur is, in my opinion, to mix it half-and-half with lime for the first sulphuring, and with two-thirds for the following ones. With these proportions our vines have always been preserved from *Oidium*."

Lime is thus an excellent diluent for sulphur; in addition to economy without loss of efficiency, its admixture should often prove highly desirable in Northern Victoria, to lessen scorching when sulphur has to be applied in hot weather, more particularly if the sulphur in use be the sublimed form, since its undesirable free acid is thus neutralized immediately.

The increased efficiency claimed in some quarters for the mixture may possibly be explained by the formation of small quantities of calcium sulphides (lime sulphur) under the influence of the moisture provided by dew or light rain.

* *Progrès Agricole*, 10th December, 1916.

† Cupric Steatite is one of the copper-containing powders largely used in France to supplement copper sprays applied against Downy mildew; it consists mainly of finely powdered talc or Steatite with 10 per cent. of copper sulphate.

§ Communication to the Société Départementale d'Agriculture de l'Hérault—July, 1903;

‡ *Progrès Agricole*, 20th September, 1914.

** *Progrès Agricole*, 10th December, 1916.

(To be continued.)



STANDARD HERD TEST.

Report for Quarter ended 30th September, 1923.

The cows which completed the test during the quarter number 427, of which 308 succeeded in qualifying for the certificate. The following are the individual records.

Owner.	No. completed Test.	Breed.	Name of Cow.	Herd Book No.	Date Calving.	Days last in Day of Test.	Milk Test.	Milk lbs.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
S. T. Algie, Murraydale	1	Shorthorn	Daisy 5th	Not yet allotted	10.11.22	273	11	6,904	3.67	lbs. 253.20	lbs. 230	283½	
J. Anderson, junior, Lyndhurst	2	Jersey ..	Linda 52nd of Kingsvale Lucy of Kingsvale ..	9177 3809	19.11.22 12.11.22	273 273	21 16	7,764 6,134	5.56 6.11	441.48 374.85	200 250	503½ 427½	365 377
W. K. Atkinson, Swan Hill	8	Shorthorn	Blanche Rose 9th .. Queenie 4th of Willow Park .. Cherry of Willow Park .. Poplar Vale Princess 20th ..	10891 12557 9198 Not yet allotted	27.9.22 28.9.22 9.10.22 13.10.22	273 273 273 273	14½ 131 40 8	11,297 4,945 15,880 7,602	3.86 4.10 4.00 3.77	435.81 202.08 635.92 287.87	250 175 250 250	496½ 231½ 250 328	272, 316, 365, 387, 357 325, 474 220, 237
			Duchess 2nd of Willow Park.. Countess of Willow Park .. Princess of Willow Park .. Cherry 5th	11459 9250 12510 10893	25.10.22 28.10.22 11.11.22 24.12.22	273 273 273 273	131 81 184 21	5,650 9,000 9,476 8,500	3.88 4.24 3.88 3.88	219.70 381.90 388.02 330.01	175 250 200 250	250½ 435½ 413½ 376½	264, 330 256 235, 218, 269, 343, 284
C. Bamford, Benalla	3	Ayrshire	Honeycomb of Medburn Grove Moonbeam of Medburn Grove .. Marjorie of Medburn Grove ..	10747 8307 8305	4.10.22 8.10.22 3.12.22	273 273 273	171 151 21	6,039 9,160 6,707	4.38 4.26 3.72	264.44 389.82 249.83	175 230 250	201½ 444½ 285	255, 327 252
A. E. Batson, Buckley	6	Jersey ..	Daisy 2nd of Somerset .. Daisy 3rd of Somerset .. Daphne of Somerset .. Lady Marge of Ferndale .. Lady Marge of Somerset .. Nancy of Somerset	9190 9191 9192 6368 10144 9198	25.9.22 26.10.22 27.10.22 29.10.22 13.11.22 31.10.22	261 273 273 273 273 228	4 51 5 6 8 4	2,492 4,449 4,438 4,726 3,857 3,576	6.70 5.49 5.85 5.86 5.47 6.08	196.50 244.28 260.13 276.75 209.25 217.41	175 175 200 250 200 200	224 273½ 299½ 315½ 238½ 248	158 278, 282 152 172

STANDARD HERD TEST—continued.

Owner.	No. completed Test.	No. Cattle.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
Mrs. Irene Beard, Outtrim	4	4	Jersey ..	Shadow of Linga Longa	11238	28.10.22	273	9½	5,380	5.65	304.15	175	346½	
				Canary 2nd of Lesterfield	10431	18.10.22	273	9	5,795	5.55	321.74	175	366½	
				Nanette 2nd of Warenda	6142	12.11.22	273	13½	5,979	5.05	355.92	250	405½	202, 367
				Shadow of Lasecombe	6143	18.11.22	246	6	7,022	5.12	359.43	250	409½	262, 281, 323, 390
F. W. Beischer, Bendigo	3	3	Jersey ..	Mischief of Linden ..	10610	26.10.22	273	6	2,815	6.60	187.73	175	211½	
				Rifa of Linden ..	7533	16.11.22	273	14½	6,940	5.14	356.39	250	407	
				Tulip of Meridale ..	7515	24.12.22	273	19½	6,636	5.63	373.90	250	426½	228, 279, 233
J. Benallock, Elliminyt	7	5	Ayrshire	Betty of Woodbyme	6117	29.9.22	271	4	5,348	4.35	232.81	200	265	
				Phyllis of Woodbyme	6119	6.10.22	242	4	5,309	3.94	209.25	200	238½	222
				Maxis of Woodbyme	7048	7.10.22	273	10½	5,141	3.91	200.85	175	229	
				Pearl of Woodbyme	7031	7.10.22	273	8½	5,011	4.57	228.86	175	261	220
F. Balgood, Staghorn Flat	1	1	Jersey ..	Pert Lass of Woodbyme	4895	15.10.22	257	4	6,757	4.43	299.27	250	341½	
				Fox's Bluebell of Staghorn ..	11252	3.10.22	273	10½	3,847	5.45	209.71	175	239	
A. A. Broad, Sutton Grange	2	2	Jersey ..	Daisy of Grangelea	11266	10.11.22	273	8½	3,352	5.88	196.97	175	224½	372
				Princess 2nd of Grangelea	9227	15.11.22	273	17	7,720	4.90	378.57	200	431½	
Gallery Brothers, Bannockburn	6	5	Ayrshire	Myra of Langley Park	6183	27.9.22	273	13½	7,560	4.12	311.62	250	355	337
				Empress of Langley Park	6178	27.10.22	245	4	7,167	3.85	270.27	250	315	266, 278
				Star of Langley Park	8557	29.10.22	273	15	4,859	4.15	201.81	175	230	
				Snowflake of Rythdale	2842	14.11.22	204	4	6,342	4.17	264.19	250	301½	241, 346, 273
H. D. W. Canobio, Toolamba	2	2	Ayrshire	Queenie of Lanzy Park	6184	15.11.22	273	11½	6,505	4.78	311.22	250	354½	237, 261
				Beauty of Quarry Hills	10135	10.10.22	273	4½	8,306	4.56	378.66	250	431½	307
				Primrose of Wethersdane	5285	23.11.22	273	4	6,892	4.01	276.60	250	313½	263

STANDARD HERD TEST—continued.

Owner.	No. completed Test.	No. Certified.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
Mrs. M. E. Carroll, Tyntynider Central	4	Nil	Red Poll					lbs.	lbs.		lbs.			
J. Carter, Marong ..	1	1	Friesian	Dinah ..	Appendix	7.10.22	273	27½	9,201	4.57	420.68	250	479½	
J. E. Chadderton, Hamilton	1	1	Jersey ..	Duchess 10th of Kyora ..	6835	15.10.22	273	22	8,964	5.07	454.43	250	5.8	
P. Chirnside, Oakleigh	6	6	Jersey ..	Meadow Sweet of Waranda .. Phyllis 2nd of Waranda .. Garnie 4th of Waranda .. Keepsake of Waranda .. Musie of Waranda .. Graceful Countess 2nd of Lestertield	9367 7195 9365 8366 7193 10268	20.9.22 2.10.22 12.10.22 14.10.22 24.10.22 7.12.22	273 273 273 273 273 273	21½ 20½ 19 16 18 22	7,292 8,466 7,644 5,839 6,587 6,454	6.09 5.06 5.61 5.86 5.39 6.33	438.94 427.97 429.10 342.33 335.10 408.37	200 250 200 250 250 250	500½ 488 489½ 390½ 405½ 465½	404 310 373 434 248 256 210
Clyne Brothers, Tinnambra	1	Nil	Jersey											
Cockbill and Gibbs, Lancefield	14	Nil	Ayrshire											
E. O. Cudmore, Coldstream	2	2	Jersey ..	Peerless 19th of Melrose .. Laura 10th of Melrose ..	7546 9893	30.10.22 7.11.22	273 273	12 13½	5,966 5,323	5.32 6.22	317.65 336.63	250 250	362 377½	289,343* 283,391
O. Cutler, Swan Hill	3	3	Jersey ..	Silk Stockings of Leahurst .. Bright Stockings of Waranda .. Meg of Elthamleigh ..	11326 7189 9185	28.9.22 9.10.22 8.11.22	273 273 273	13 12 10	4,918 6,338 5,830	5.54 4.84 4.76	272.62 306.49 277.77	175 250 250	310½ 349½ 316½	288,296 330

* This record when published was in name of Peerless 20th of Melrose.

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Certi- ficated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Aver- age Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
R. Faragher, Korot	1	1	Jersey ..	Belle of Mona Bank ..	11399	18.10.22	273	lbs. 51	lbs. 4,663	5.32	lbs. 248.10	lbs. 173	lbs. 282½	.
R. Ferguson, Riddell	1	1	Friesian	Springfield 14 ..	1010	6.12.22	269*	20	9,732	3.24	315.19	200	350½	
A. L. Fawceter, Nilma	1	1	Jersey ..	Linda 35th of Kingsvale ..	6278	5.10.22	273	16	6,661	5.12	311.02	250	388½	328
A. W. Findlay, Leitchville	2	2	Jersey ..	Werrilbee Northwood's Attrac- tion Larkspur of Tuerong ..	6538 10481	27.9.22 17.10.22	273 273	11 9½	5,342 5,257	5.86 5.14	312.86 270.12	250	356½	341
Finn Bros., Bundoora	4	4	Jersey ..	Thana of Somerville .. Princess Royal of Springhurst .. Valda's Queen of Somerville... Trixie of Tampirr ..	6917 5403 5948 5173	4.10.22 24.10.22 5.11.22 26.11.22	273 273 273 273	13 15 8½ 10	9,742 9,613 8,766 7,346	5.65 5.26 4.70 5.85	550.44 505.69 411.69 429.43	250 250 250 250	627½ 576½ 461 469½ 355 480	359, 486 294, 334, 412 461 464, 336 355, 457, 516,
Fixter and Sons, Boisdale	1	1	Jersey ..	Queenie of Riversdale ..	12922	24.12.22	273	13	4,377	5.61	245.65	175	280	
Flack and Sewell, Berwick (Burnbank Herd)	1	Nil	Friesian	.										
Flack and Sewell (Ardblair Herd)	3	3	Friesian	Bainfield Topsy 15th .. Rosevale Jessie Posch .. Rosevale Rosie Abbeckirk ..	Not yet allotted 1096 1094	5.11.22 20.12.22 21.12.22	273 273 273	19 41 29	7,465 11,944 12,318	4.69 3.17 3.52	349.75 378.95 433.99	175 200 200	303½ 432 491½	354 347

* Withdrawn before completion of term.

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Cotti- nued.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Aver- age Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
Flack and Swell (on A. V. Becker's farm)	3	1	Friesian	Burnbank Inka Sylvia Wahu	Not yet allotted	5.11.22	273	lbs. 17	lbs. 5,273	3.56	lbs. 187.55	lbs. 175	lbs. 213	
M. and W. A. Fran- cis, Kileunda	1	NII	Ayrshire											
M. Galbraith, Tyers	3	NII	Ayrshire											
G. Gange, Mininera	1	1	Ayrshire	Eva 2nd of Glincain	7298	7.12.22	273	5½	6,879	4.05	278.53	250	317½	280, 270
N. Gange, Mininera	5	2	Ayrshire	Petal of Roseleigh .. Pansy of Roseleigh	7303 7322	6.10.22 13.10.22	273 262	10 4	7,516 4,878	3.47 4.51	260.78 220.14	250 175	297½ 251	238
Geelong Harbor Trust, Marshall- town	8	7	Ayrshire	Bluebell of Sparrovale Gipsy Girl of Sparrovale Nancy of Sparrovale Blossom of Sparrovale Horonia of Sparrovale May of Sparrovale .. Poppy of Sparrovale	3886 3894 9102 3885 7369 3902 9106	25.9.22 8.10.22 11.10.22 12.11.22 14.11.22 22.11.22 30.11.22	273 273 273 267 273 273 273	10½ 5½ 6 4 17 7½ 17½	7,797 7,515 8,761 6,376 8,869 7,025 6,195	4.00 4.71 4.69 4.25 4.53 3.94 4.12	311.81 353.97 176.98 270.89 403.10 273.54 255.33	250 250 175 250 250 250 175	355½ 403½ 201 308½ 400 316½ 291	176, 299, 361, 338, 315 324 266, 315, 307 400 236, 267, 276, 350
H. S. Gibson, Murray- dale	6	5	Ayrshire	Pansy 3rd of Evergreen Duchess 2nd of Evergreen Rosella of Sunnyside Dulcie of Evergreen .. Highland Queen of Evergreen	9120 9114 7687 9115 7319	26.9.22 30.9.22 11.10.22 31.10.22 11.12.22	273 273 273 273 273	17 12 15 14½ 8½	6,808 5,461 7,761 7,704 8,008	4.46 4.02 4.51 4.31 4.31	303.71 219.69 340.19 332.12 345.27	175 175 250 250 250	346½ 250½ 387½ 378½ 393½	263 327

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Culti- vated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Aver- age Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
Gibson Bros., Tra- falgar	3	3	Jersey ..	Buttercup 12th of Ferntree Vale	9375	26.9.22	273	lbs. 11½	5,603	5.96	363.46	250	lbs. 448½	
				Buttercup 15th of Ferntree Vale	9376	2.10.22	273	12½	5,392	5.38	300.95	175	343	
				Laurie ..	3043	25.10.22	273	15	6,168	5.81	358.48	250	408½	274
R. Goodman, Kil- many South	3	2	Ayrshire	Vanity of Burnside	9137	28.9.22	273	13½	5,614	4.54	254.94	250	290½	218
				Gem of Burnside ..	9133	7.10.22	273	15	5,009	4.37	229.14	175	261½	
D. F. Griffiths, In- verleigh	2	0	Ayrshire											
T. Harvey, Boisdale	2	2	Jersey ..	Sparkle 2nd of Jerseyholm	5920	6.10.22	273	13	6,764	5.84	394.82	250	450	304, 415, 414
				Bluebell 5rd of Jerseyholm ..	9391	29.10.22	273	16½	6,711	5.56	372.81	260	425	
W. Henderson, Gras- mere	37	3	Ayrshire	Lola of Carracoorte..	9401	30.9.22	247	4	4,120	4.38	180.45	175	205½	
				Gerty 3rd of Carracoorte ..	9376	3.10.22	273	7	5,915	5.04	299.69	250	341½	221, 218
J. Hutchinson, Somer- ville	4	4	Jersey ..	Lucy 3rd of Carracoorte ..	9405	17.10.22	294	4	5,740	4.84	181.03	175	200½	
A.W. Jones and Son, Geelong	5	5	Jersey ..	Midhill of Somerville	11486	26.9.22	273	21½	6,637	4.79	317.73	175	362½	
				Beauty 5th of Somerville ..	9413	1.10.22	273	19½	8,703	4.40	382.75	260	436½	258
A.W. Jones and Son, Geelong	5	5	Jersey ..	Vesta of Somerville..	11491	7.10.22	273	21½	7,262	5.10	370.53	175	425½	
				Princess Valda of Somerville	11488	17.10.22	273	21½	6,687	5.11	341.93	175	389½	
A.W. Jones and Son, Geelong	5	5	Jersey ..	Lady Grey 12th of St. Albans	9433	30.10.22	273	10½	5,872	5.57	327.11	250	373	321, 302
				Lady Grey 17th of St. Albans	11514	17.11.22	273	18	5,634	5.38	297.62	175	339½	
				Lady Grey 15th of St. Albans	10275	29.11.22	273	24	7,331	5.38	394.00	260	449½	311
				Blue Lass of Linden	7520	18.12.22	22½*	13	3,459	5.27	208.53	200	237½	
A.W. Jones and Son, Geelong	5	5	Jersey ..	Rose of Hillcrest ..	6017	24.12.22	273	13	5,336	5.01	267.15	250	304½	

* Sold before completion of term.

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Cetti- leated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days In Test.	Milk last Day of Test.	Milk. lbs.	Aver- age Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
A. W. Jones and Son —continued.	10	10	Friesian	Tulip Flower	1029	28.9.22	273	31	11,132	3.31	368.44	250	lbs. 420	308, 417
				St. Alban's Daffodil Mercena	651	23.10.22	273	23½	8,550	3.72	318.27	175	362½	279, 328, 378
				St. Alban's Lady	360	26.10.22	273	11	9,612	3.41	328.05	250	374	294
				Beryl of Craignell	1034	7.11.22	273	23½	10,057	3.57	359.33	200	409½	298
				Ransome Lass 2nd	1033	8.11.22	273	22½	10,653	3.64	387.39	250	441	355, 396, 441
				Her Royal Highness	359	9.11.22	273	37	12,455	3.82	413.58	250	471½	288, 422
				Queen Curley	1027	1.12.22	273	21	10,243	3.43	351.71	250	401	326, 484
				Daffodil Mercena	1030	4.12.22	273	31½	10,413	3.76	392.45	250	447½	410, 519, 617,
				Westmere Pontiac Magpie	Not yet allotted	8.12.22	273	18	7,288	3.87	281.70	175	321½	391, 534
				May Queen 2nd	347	20.12.22	273	19½	10,200	4.55	464.45	250	520½	
A. Joshua, Berwick	4	4	Jersey	Chaffinch of Banyule	9481	29.9.22	273	4	5,511	5.67	312.37	200	356	
				Christmas Bell of Hillcrest	7032	30.10.22	273	8	5,679	4.97	282.17	250	321½	
				Mistletoe 3rd of Tampirr	9443	6.11.22	273	6	4,395	5.78	253.93	200	289½	
G. Kent, Archie's Creek	4	4	Ayrshire	Violet of Hillcrest	7048	7.12.22	273	11	6,724	4.67	314.05	250	358	
				Bud of Woolamal Park	7434	28.9.22	273	11	4,582	4.61	211.41	175	241	
				Peggy of Woolamal Park	5275	4.10.22	273	6½	6,137	4.35	266.83	250	304½	224, 244
Kerr Bros., Bacchus Marsh	8	7	Shorthorn	Marjory of Woolamal Park	7437	9.11.22	273	4	4,069	4.43	180.38	175	205½	
				Daisy of Woolamal Park	7435	13.11.22	273	7	4,117	4.47	184.06	175	209½	
				Morven Duchess of Brunswick 3rd	Not yet allotted	2.10.22	273	10	6,750	4.33	292.11	200	333	234
A. Kirby, Daylesford	2	1	Ayrshire	Morven Duchess 15th	"	3.10.22	273	9	10,024	3.81	381.57	250	435	285, 350, 374
				Morven Duchess 13th	"	4.10.22	273	8½	8,906	3.95	351.57	250	400	306, 361, 366
				Morven Nellie 10th	"	11.10.22	273	15	5,758	3.97	298.74	175	304	236, 250
				Morven Daphne 15th	"	12.10.22	273	8	6,995	3.82	267.36	175	304	338, 446
				Morven Cressida 2nd	"	21.10.22	271	5½	6,126	3.99	244.48	250	278½	
				Morven Pearl 8th	"	7.11.22	273	28	13,903	3.95	348.49	250	625½	
				Sparkle of Glencra	4001	17.10.22	273	17½	7,260	3.83	279.95	250	319½	251, 282, 224

STANDARD HERD TEST—continued.

Owner.	No. completed Test.	No. Cullified.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
P. H. Lawrence, Agnes	2	2	Jersey ..	Noble's Morecco of Rainga .. Little Queen ..	9456 5249	4.11.22 16.12.22	273 273	19½ 16½	6,645 6,634	4.55 5.11	302.13 339.17	200 250	344½ 380½	266 359, 366, 467, 376, 432, 325
C. Lees, Lockington	11	10	Ayrshire	Bertha of Winslade .. Madge of Holly Green .. Selina of Burnside .. Swiss of Springburn Park .. Model 3rd of Glenelg .. Modesty of Yalart .. Roseleaf 2nd .. Lady Lass 2nd .. Dahlia 3rd .. Marilla of Burnside ..	6979 6950 9749 9754 9739 9741 10701 11199 10695 11202	9.10.22 9.10.22 11.10.22 15.10.22 24.10.22 6.11.22 16.11.22 16.11.22 17.12.22 20.12.22	273 273 273 273 273 273 273 243 273 273	11½ 7 5½ 10½ 14 4 19½ 9 8½ 18	8,176 3,940 6,163 5,425 7,917 7,243 5,126 4,904 5,195 6,753	4.36 4.20 4.62 4.58 4.21 3.97 4.90 4.24 4.15 4.09	356.77 249.73 285.02 248.52 333.32 287.37 251.40 210.58 231.17 276.47	250 200 200 175 250 200 200 200 200 250	406½ 284½ 283½ 283½ 380 327½ 286½ 240 263½ 313½	379 213
Mrs. E. M. Lennie, Tongala	4	4	Jersey ..	Primrose 2nd of Tampirr .. Primrose 2nd of Bonshaw .. Tulip 4th of Bonshaw .. Tea Rose of Tampirr ..	7061 7102 7103 10312	18.10.22 25.11.22 29.11.22 19.12.22	273 273 273 273	7 12 12 7	6,026 5,388 5,420 5,327	5.25 5.11 4.66 5.86	316.27 275.16 252.56 312.03	250 250 250 250	360½ 313½ 288 355½	212, 356 346, 310, 277 338, 324, 287 388
Leongatha High School	2	2	Jersey ..	First Choice of Hillcrest .. Sunset Star of Dunalister ..	7034 5927	28.9.22 9.11.22	273 273	8 10	8,845 7,383	5.66 5.04	501.01 371.88	250 250	571½ 424	183, 409, 392, 507, 516, 491, 350, 380, 495 469, 442
C. D. Lloyd, Narre Warren	1	Nil	Jersey											
J. G. Lobb, Cardinia	3	3	Ayrshire	Vida of Burnside .. Daphne of Quarry Hills .. Marcia of Holly Green ..	9788 9786 6993	4.10.22 14.10.22 17.11.22	213 273 273	12 13 12½	5,320 5,900 5,452	4.21 4.20 4.16	223.93 252.87 227.85	200 175 175	265½ 298½ 269½	

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Certi- ficated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Aver- age Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
H. Luxton, Whittle- sea	7	7	Jersey ..	Twylsh's Twinkle of Marimba	10323	28.9.22	273	lbs. 5,499	5.27	289.55	lbs. 175	lbs. 330	
				Lily of Ferntree Vale ..	9488	14.10.22	273	7,510	5.25	393.99	250	330	328
				Dunalister Mannikin Noble Myrtle	10388	18.10.22	273	12	4.623	266.81	175	304	
				Audrey of Somerville ..	5946	20.10.22	273	13	6.256	337.34	250	384	413, 425, 381
				Cloudy of Somerville ..	9414	24.10.22	273	23	7.335	396.60	250	453	372, 459
C. G. Lyon, Heidel- berg	9	8	Jersey ..	Maid of Linden ..	7251	30.10.22	273	22	8.061	386.54	250	440	339, 345, 378
				Pearl 5th of Holmwood ..	6492	13.11.22	273	31	8.537	405.63	250	463	
				Hawthorn 8th of Banyule ..	9484	30.9.22	273	17	6.133	353.80	175	403	
				Molly 8th of Banyule ..	9499	9.10.22	273	23	7.978	452.89	200	516	304
				Thora 9th of Banyule ..	9510	31.10.22	169*	19	4.694	235.50	200	286	270
McFarlane Bros., Bundoora	9	9	Ayrshire	Audrey Lotus of Banyule ..	9478	4.11.22	273	21	7.713	358.17	200	408	274
				Silvermine 18th of Banyule ..	6080	24.11.22	273	21	9.211	462.32	250	527	358, 432, 449
				Macree of Banyule ..	9480	26.11.22	273	19	4.440	300.40	200	342	277
				Silvermine 24th of Banyule ..	11601	12.12.22	273	15	5.040	298.92	175	340	288, 344, 460,
				Harp ..	5206	9.12.22	273	16	5.532	274.76	250	313	385, 280
W. McIvor, Morand- ing	4	4	Ayrshire	Queen Marie of Glenelra ..	11259	26.9.22	273	8	5.825	233.40	175	266	259, 288
				Queen Mary of Glenelra ..	6151	8.10.22	247	4	6.971	271.63	250	309	288, 287, 324,
				Marvis of Ayrbrae ..	9968	9.10.22	273	14	6.419	4.25	175	310	316
				Daphne of Ayrbrae ..	5403	21.11.22	273	5	7.720	365.97	250	417	188
				Virtue of Ayrbrae ..	7565	21.11.22	273	11	5.159	231.36	200	263	281, 246
W. McIvor, Morand- ing	4	4	Ayrshire	Heather Belle of Ayrbrae ..	6640	7.11.22	273	9	7.673	321.57	250	366	208, 258, 286
				Mulberry of Ayrbrae ..	5405	7.12.22	260	6	7.071	291.61	250	332	188
				Lady of Ayrbrae ..	7562	9.12.22	273	8	5.498	242.60	200	276	242, 235
				Lassie of Ayrbrae ..	6641	18.12.22	260	9	6.475	253.93	250	280	293
				Chance of Golden Vein ..	5417	24.10.22	248	4	6.507	261.66	250	493	276
W. McIvor, Morand- ing	4	4	Ayrshire	Edith of Golden Vein ..	5419	1.11.22	240	4	5.953	283.59	250	323	278
				Empress 3rd of Golden Vein ..	5421	9.11.22	256	4	5.902	250.17	250	292	
				Follage of Golden Vein ..	5423	12.11.22	257	9	5.374	251.37	250	286	

* Sold before completion of full term.

STANDARD HERD TEST—continued.

Owner,	No. com- pleted Test.	No. Certi- ficated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Aver- age Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
W. J. McKernan, Byrneside	3	3	Ayrshire	Dot of Golden Vein Star of Kelvin Grove Countess of Locheden	2634 6104 10012	22.10.22 10.11.22 7.12.22	273 251 273	lbs. 8,437 7,356 6,929	4.60 4.31 4.35	lbs. 388.19 317.08 301.41	lbs. 250 250 175	lbs. 442 361 343	347, 404 292, 266
P. J. Maloney, Ton- gala	4	4	Jersey ..	Lady of Belgonia. Marie of Bonshaw. Beauty of Belgonia Tiny Choice of Belgonia	9551 7171 9548 11634	2.10.22 18.11.22 29.11.22 6.12.22	273 273 273 273	lbs. 5,366 7,029 7,231 6,254	5.58 4.61 5.52 6.13	lbs. 299.38 323.80 339.08 383.54	lbs. 250 250 260 175	lbs. 341 369 455 437	243, 296 241, 297, 367 400
W. R. Meredith, Ondit	2	Nil	Ayrshire										
T. Mesley, Dalyston	3	3	Jersey ..	Lily of Rosemont Pansy of Rosemont Peggy Pride of Warendale	11926 10343 11647	6.10.22 9.10.22 19.10.22	273 273 273	lbs. 5,152 7,700 5,650	6.07 5.68 6.62	lbs. 312.77 438.75 374.09	lbs. 175 200 200	lbs. 356 560 425	257 298
D. C. Miller, Agnes	5	2	Jersey ..	Princess of Kirkhill. Daisy 2nd of Ferndale	11648 5568	3.10.22 8.10.22	254 250	lbs. 3,774 4,971	5.06 5.36	lbs. 190.85 266.37	lbs. 175 200	lbs. 217 303	198
E. J. Moore, Cowes	1	1	Jersey ..	Fairy Bell of Rochdale	9793	4.10.22	273	lbs. 4,822	5.05	lbs. 243.34	lbs. 200	lbs. 277	211
R. G. Morton, Bac- chus Marsh	1	Nil	Shorthorn										
W. J. Muhlebach, Innesford	5	4	Ayrshire	Pearline 2nd of Retreat Lobelia 2nd of Retreat Gertie of Ben Kell Beautiful of Retreat	7538 7534 7533 5381	26.9.22 12.10.22 24.10.22 27.10.22	246 273 273 269	lbs. 4,471 4,986 4,402 7,833	4.47 4.49 4.24 4.40	lbs. 190.86 223.53 186.72 345.02	lbs. 175 175 175 250	lbs. 228 254 213 393	324

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Certi- ficated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days last in Test.	Milk last Day of Test.	Milk. lbs.	Aver- age Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
H. J. Munro, Casterton	2	2	Ayrshire	Elsie of Glencourt .. Daphne of Glencourt ..	7543 9932	29.9.22 6.12.22	273 273	8½ 8½	8,063 4,200	4.11 4.63	331.44 194.46	lbs. 250 377½ 221½	236	
C. G. Newton, Kilmany South	2	NH	Ayrshire											
Mrs. E. O'Donoghue, Killmore	4	4	Ayrshire	Roseleaf of Hill View .. Lizzie of Hill View .. Holly of Hill View .. Rosebud 2nd of Hill View ..	10095 10092 10091 11295	17.10.22 2.11.22 3.11.22 11.11.22	236 273 273 273	4 14 14 13½	5,320 5,537 4,704 5,274	4.47 3.80 4.44 4.29	237.64 211.36 209.13 226.22	271 241 238½ 238		
J. T. O'Loughlin, Dandenong	2	NH	Red Poll											
Mrs. Lilian Orchard, Grahamvale	5	3	Jersey ..	Tulip of Jerseyvale .. Rose of Jerseyvale .. Daffodil of Jerseyvale ..	10360 9590 7220	30.10.22 3.11.22 17.11.22	273 273 273	15½ 9 15	5,332 4,603 4,693	5.17 5.12 5.35	275.46 235.62 251.68	250 200 250	314 204 286½	260 198 229, 251
T. H. Payne, Kilmore	3	1	Red Poll	Plumstead Pip ..	220AA	3.10.22	273	7	6,387	4.55	280.06	250	320	322
H. Perdiau, Werribee	1	1	Jersey ..	Woodmore Fairy ..	10366	26.10.22	273	17½	6,144	6.20	381.23	250	454½	
	2	1	Ayrshire	Patch of Banyule ..	10143	19.11.22	224	4	5,408	4.68	253.03	250	288½	254
D. Peter, Mornington	3	3	Jersey ..	Dunalister Perries Attractive .. Dunalister Noble Myrtle .. Dunalister Noble Czarina ..	10410 10406 10403	4.10.22 3.10.22 26.11.22	273 236* 273	9½ 14½ 16½	6,650 6,754 7,951	5.84 5.35 4.72	386.88 361.62 374.88	250 250 250	441 412½ 427½	

* Withdrawn through sickness.

STANDARD HERD TEST- continued.

Owner.	No. com- pleted Test.	No. Certi- ficated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Day of Test.	Milk last Day of Test.	Milk.	Aver- age Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
J. Phillips, Murray- dale	1	1	Jersey ..	Carnation of Ferntree Vale ..	9637	24.12.22	273	194	lbs. 6,513	5.24	lbs. 341.37	lbs. 200	lbs. 389½	274
R. Purnell, Moriac	2	2	Jersey ..	Lady Grey 18th of St. Albans Laurie 2nd of Ferntree Vale..	11515 9556	26.10.22 13.11.22	273 273	104 8	4,920 5,478	5.18 5.08	253.37 278.38	175 200	291 317	
R. Rakton, Mogdon- emby	7	7	Ayrshire	Winnie of Ben Kell .. Lady Dulcie of Ben Kell .. Poppy of Ben Kell .. Brunette of Willowvale .. Crisie of Willowvale .. Isle of Ben Kell .. Parlour of Ben Kell ..	6744 5731 5731 6735 6736 6739 5733	25.9.22 26.9.22 27.9.22 27.9.22 27.9.22 17.10.22 18.11.22	273 273 269 269 273 273 255	194 4 4 4 71 134 4	8,716 7,409 10,243 5,869 5,631 7,036 7,406	4.34 4.03 4.70 4.19 3.65 4.27 4.01	378.69 300.12 481.06 243.06 205.54 300.43 285.18	200 200 250 200 200 200 250	431½ 356 324, 412, 286 208 210 312½ 325½	259 356 324, 412, 286 208 210 312½ 325½
J. D. Read, Spring- hurst	1	1	Jersey ..	Gladiolus of Springhurst. ..	12216	18.11.22	273	22	5,987	5.70	341.35	175	380½	
Miss Bruce Reid, Bundoora	5	3	Jersey ..	Jubilee Wattle .. Maury Lilac of Kanemka .. Jubilee Azalea Winks ..	10460 7349 7358	10.11.22 16.11.22 10.12.22	273 273 273	17 16 15	6,711 5,951 5,877	4.95 5.45 5.99	332.34 324.36 351.88	200 250 250	378½ 370 291½	229 342, 292, 276 356, 387
C. L. Rigby, Lower Ferntree Gully	3	1	Ayrshire	Gracie of Netherbrae ..	10217	20.11.22	273	9	5,293	3.57	189.03	175	215½	
A. Robertson, Toora- din	2	2	Jersey ..	Gipsy of Hillcrest .. Handsome of Lesterfield ..	7035 10269	7.10.22 11.12.22	273 273	54 164	6,214 5,915	4.37 4.80	271.71 283.80	250 250	300½ 323½	223
Miss S. L. Robinson, East Malvern	6	5	Jersey ..	Kyora Anthem .. Kyora Needle 3rd .. Starbright of Rubbank .. Needle of Rubbank.. Kyora Velvetreen ..	11686 11687 12229 Not yet allotted 10466	8.10.22 11.10.22 19.10.22 19.10.22 17.12.22	273 273 273 273 273	8 84 11 84 20	3,460 3,292 3,631 3,075 4,499	5.28 6.62 5.28 6.13 5.27	182.65 217.80 191.82 188.59 237.14	175 175 173 173 200	208½ 248½ 218½ 215 270½	245

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Certi- ficated. . .	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Aver- age Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
W. B. Ronald, Paken- ham East.	3	1	Jersey ..	Dunalister Lady Lydia ..	10376	7.10.22	273	10	5,128	5.31	272.48	200	310½	
G. Rowe, Kartella	3	2	Jersey ..	Joy of Hillcrest Sweet Pansy 5th of Melrose ..	10468 7460	26.11.22 16.12.22	259 273	4 10½	4,067 5,109	5.45 6.24	221.59 318.64	200 250	252½ 363½	205 245, 311, 362
S. Russell, Tongala	4	4	Friesian	Tongala Doris ..	Not yet allotted	18.10.22	261	4	7,460	3.60	268.36	250	301½	
"				Dimple of Craignell..	1070	16.11.22	273	18	9,814	3.62	355.67	200	405½	311
"				Mossvale Sweet Nell ..	Not yet allotted	16.11.22	246	4	5,222	3.82	190.42	175	227½	
Agricultural High School, Sale	2	Nil	Ayrshire	Springfield No. 9 ..	1071	30.11.22	273	28½	12,331	3.95	487.11	200	555½	357
A. H. Schier, Kernot	14	8	Ayrshire	Adella's Pet of Inverleigh Dolly Brown of Inverleigh ..	5833 5854	10.10.22 10.10.22	273 273	13½ 19½	8,629 7,261	3.78 3.92	326.49 284.35	250 250	372½ 324½	250, 273, 226, 253, 205
"				Scotswood Mistress ..	10310	23.10.22	273	14½	6,486	4.23	274.22	175	311½	180
"				Dolores 2nd of Banyule ..	10286	28.10.22	273	5½	5,077	4.55	231.08	200	263½	216
"				Queen of Scots 2nd of Banyule ..	10290	9.11.22	257	4	5,851	4.82	282.24	200	321½	
"				Scotswood Marigold ..	10304	20.11.22	273	17½	7,283	3.69	269.03	175	306½	
"				Gold Point 2nd of Banyule ..	10288	28.11.22	273	12	5,682	4.80	272.97	200	311½	224
"				Scotswood Daphne Brown ..	10294	16.12.22	273	10	4,493	4.20	188.84	175	215½	
J. Scott, Heidelberg	1	Nil	Jersey											
O. J. Syme, Macdon	9	8	Friesian	Dominion Jessie of Oakville 2nd Coldstream Moss Rose ..	1122 1121	1.10.22 7.10.22	273 273	13½ 15	6,409 8,032	3.57 4.78	228.37 383.50	175 175	261 437½	302
"				Colantha Carly Segis ..	1111	24.10.22	257	4	9,960	3.45	343.60	200	391½	
"				Belle Van Cleve ..	1113	29.10.22	248	4	7,658	3.66	278.91	200	319	291
"				Bolebek Diana Rue ..	332	9.11.22	240*	7½	7,002	3.58	250.90	200	286	174
"				Belle Johanna Rue ..	1114	18.11.22	259	4	6,429	3.71	238.89	200	272½	391, 348, 420, 365, 467
"				Duplicate Pusch Naud ..	300	19.11.22	273	31	13,699	3.17	434.36	250	495½	
"				Bolebek Ursula ..	323	6.12.22	273	18	8,240	3.59	296.20	250	337½	296

* Sold before completing test.

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Cer- tified.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Aver- age Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
J. R. Telford Estate, Kyabram	4	4	Ayrshire	Trislie of Wetherslane Adora of Fern Hill .. Dolly 4th of Glengowrie Countess of Burnside ..	4172 5924 5999 5998	25.9.22 29.9.22 7.10.22 12.10.22	273 273 273 273	lbs. 7,549 8,419 9,672 7,231	4.28 4.43 4.33 4.28	lbs. 323.37 370.69 428.77 390.35	lbs. 250 250 250 250	lbs. 368½ 422½ 489 352½	363 349 376 311
W. Tendeson, Lily- dale	1	1	Jersey ..	Silvermine of Brookside ..	9724	17.11.22	273	11	5.463	325.87	250	371½	288
J. Thorburn, Wood- end	3	Nil	Ayrshire										
T. Treaskis, Tongala	1	1	Jersey ..	Romany Girl 2nd of Tarnpurr	7062	13.11.22	273	9½	6.918	362.58	250	413½	243, 240
J. T. Tuckey, Alber- ton	3	2	Ayrshire	Ideal of Tregorland .. Trinket of Tregorland ..	10550 11468	27.9.22 29.9.22	263 273	4 8½	5.284 5.089	278.13 200.13	250 200	317 228½	
J. T. Tweddle, Ber- wick	3	4	Friesian	Jessie Forbes Homestead of Oakview Ashlynn 52nd St. Alban's Cordylne Hazel .. Ashlynn 56 ..	1079 1084 649 1086	4.10.22 11.10.22 20.10.22 31.10.22	273 273 273 273	13 24 8½ 6	7.243 8.023 5.030 5.920	281.10 297.45 186.73 231.42	200 200 175 200	320½ 330 213 263½	250 263 254
G. Vallance, Bacchus Marsh	7	7	Ayrshire	Ruby of Banyule .. Dot 3rd of Belwell .. Rose of Lake Valley .. Etlic of Banyule .. Joan of La Motte .. Aspasia of Banyule .. Pretty of Belwell ..	6792 11482 11486 5778 5257 5761 11485	25.9.22 3.10.22 27.10.22 20.10.22 26.10.22 9.12.22 24.12.22	273 273 273 273 263* 263* 248*	12 13½ 14 11 16 194 13½	8.178 7.352 6.845 8.304 7.830 9.541 6.331	346.21 262.75 256.40 381.49 397.43 368.18 269.73	250 250 200 250 250 250 250	304½ 293½ 292½ 435 350 350 307½	247 274 332 412, 264, 220 382 241

* Herd withdrawn before test was completed.

STANDARD HERD TEST—continued.

Owner.	No. com- pleted Test.	No. Ceph- licated.	Breed.	Name of Cow.	Herd No.	Date of Calving.	Days in Day of Test.	Milk Test.	Aver- age Test.	Butter Fat.	Standard Required	Estimated Butter.	Previous Butter Fat Records in lbs.
R. Viet, Trentham	1	1	Jersey ..	Fuchsia 2nd of St. Albans ..	12035	1.11.22	273	lbs. 4,485	5.29	237.03	lbs. 175	lbs. 270½	
A. L. N. Walter, Little River	3	3	Jersey ..	Daisy 2nd of Ferntree Vale .. Postcard of Tarnpir .. Flower of Paradise ..	9398 5167 11737	15.10.22 22.10.22 17.12.22	273 273 273	62½ 4,597 4,086	5.39 6.55 5.83	335.11 301.01 238.10	200 250 175	382 343½ 271½	249 338, 342, 364
Agricultural High School, Warragut	2	2	Red Poll	Wyreema .. Gipps Wendy ..	283A 861B	10.11.22 20.11.22	273 250	4,086 4,080	4.32 4.01	215.16 199.93	175 175	245½ 228	
H. L. Webb, Sumbury	5	4	Ayrshire	Lily's Queen of Holly Green .. Empress of Holly Green .. Milkmaid of Holly Green .. Rosebloom of Holly Green ..	11405 6042 6045 6957	7.10.22 7.11.22 20.11.22 23.12.22	247 273 273 273	5,978 7,625 8,252 7,634	4.21 4.46 4.12 3.94	251.66 340.04 339.05 300.77	175 250 250 175	287 387½ 386½ 342½	263 190, 297
J. F. Williams, Yin- nar	1	1	Friesian	Carlyle Lady ..	1137	18.10.22	273	8,084	3.30	206.81	175	304½	
J. Wills, Bacchus Marsh	1	1	Friesian	Jennie of Lerderg	..	7.10.22	273	7,580	3.65	276.94	175	315½	
W. Woodmason, Mur- rumbeena	6	6	Jersey ..	Lady Elector 3rd of Melrose Lassie Fowler 4th of Melrose .. Graceful Duchess 17th of Mel- rose Jessie 15th of Melrose .. Lassie Fowler 10th of Melrose Graceful Duchess 25th of Mel- rose	5549 4522 9879 5546 11780 11778	25.9.22 23.10.22 29.10.22 1.11.22 16.11.22 6.12.22	273 273 273 273 273 273	7,552 7,696 6,116 6,571 4,602 4,420	5.63 5.54 6.03 6.16 5.89 5.43	425.08 426.03 388.17 404.74 270.94 240.15	250 250 250 250 175 175	484½ 485½ 442½ 461½ 308½ 273½	268, 337, 404, 408, 446 340, 426, 470, 472, 433 333, 363 270, 326, 351, 361, 356, 340

WEEDS AND THEIR ERADICATION.

(Continued from page 512)

By H. W. Davey, F.E.S., Orchard Supervision Branch, Department of Agriculture.

Cape Broom, *Cytisus canariensis*. Steudel. Family: Leguminosæ.

This plant is a native of the Canary Islands, as its botanical name implies, and is yet another of the useless importations from which this country suffers.

The plant itself (Figure 69) is too well known, with its erect stems, yellow flowers, and soft hairy leaves to need any description. It is a proclaimed plant under the Vermin and Noxious Weeds Act in fourteen shires.

Cape Broom often grows to a height of several feet. It should be dug out, piled and burnt before its seeds are ripened. On arable land seedlings are easily destroyed by cultivation, but where ploughing cannot be practised the young plants can be destroyed by means of an arsenical spray. This useless scrub soon becomes a serious pest when neglected, often taking possession of roads little used by vehicular traffic.

In addition to its uselessness for fodder, and the cover it affords to rabbits, its foliage is reputed, in common with some others of its genus, to be slightly poisonous.

One of the most serious charges against it, however, is that it may become a serious trouble to the orchardist, inasmuch as it frequently acts as a host plant for the apple-bark mussel scale, *Mytilaspis pomorum*. This and other of the family *Coccidae* are proclaimed insects under the Vine and Vegetation Diseases Act, and it can easily be seen what a menace to the fruit-growing industry a neglected area of Cape Broom may become. The writer has seen Cape Broom stems badly infested with this scale, so that it is not surprising that many a fruit-grower wonders where his supply of scale insects keeps coming from in spite of all his diligence with the spray pump in his orchard.

When the young of this scale hatches out during the spring months, the dust-like, but active young scale insects will attach themselves to the legs of birds and flies or other insects, or may be borne away by winds, and by these agencies become transported to apple trees.

The number of scale insects that may hatch out on a single plant is almost incredible, but it is a law of nature that where mortality is great, reproduction must also be great. This species of scale has a fixed existence once it commences to feed, and here another rule applies. An animal having a fixed existence when mature has a free moving, swimming, or flying existence when young, and this scale, on its emergence from the egg, is an active running insect, and thus is enabled to avail itself of the aid of birds, insects, or wind to become transported to other plants, some of which may be situated long distances from where the scale insect was hatched.

It can therefore be easily seen that Cape Broom, in addition to being a pest to the land-owner, is likely to become a tax to the apple-grower, in fact, to the fruit industry in general, as, in addition to the apple-bark



Cape Broom (*Cytisus canariensis*) Blossom.
(Photographed first week in November.)

scale, Cape Broom is occasionally the host plant of olive scale, *Lecanium oleæ*, an enemy of the citrus fruit grower. The latter scale excretes a kind of honey-dew, which is then attacked by *Capnodium citri*, a fungus. This, besides lessening the value of the fruit, lowers the vitality of the tree by preventing the proper functioning of its leaves.

To be continued.

POULTRY NOTES FROM WERRIBEE.

By W. O. Pederick, Poultry Foreman.

So that the young birds may have room to grow and develop, culling of both young and old stock is now being carried out.

Pullets hatched in July and August are now coming in to lay. Every effort is made to prevent pullets laying too early. No meat is fed them, and they are given as much liberty as possible.

Cockerels intended for stud birds are on free range, where they can obtain plenty of insects, seed, and natural food. In addition, they are liberally fed on wet mash in the morning and given plenty of grain at night.

Plentiful supplies of clean cool drinking water are available, and ample shade is provided to protect the birds from the sun. During the warm weather special attention is paid to the ventilation of the houses, and the dust baths are moistened on the hot days.

The laying hens are being fed liberal quantities of green stuff in the morning mash, and it has been found profitable to also feed chaffed green stuff after the evening feed of grain.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

As a preventive against codlin moth, apple and pear trees should be sprayed with arsenate of lead whenever there is danger from the prevalence of the moth. One of the secrets of success in codlin moth spraying is the destruction of as many as possible of the insects of the first brood. Thus, if particular care is given to the early sprayings, keeping the fruit covered with spray for a month or six weeks after setting, this result is easily accomplished. Some growers prefer to gather all fruit infected by the first brood, spraying only for the second

and later broods. Even if all the fruits attacked are gathered, which very rarely happens, the grower suffers from the loss of fruit, which he can ill afford, unless his crop be a heavy one.

Another feature for consideration is the fact that the presence of any arsenical spray on the foliage is responsible for the destruction of the pear and cherry slug, root-borer beetle, and all forms of leaf-eating insects.

Spraying the cherries for the slug will now be necessary. Arsenate of lead may be used, provided the fruit is not far advanced. Hellebore, and also tobacco water, are effective against this pest.

CULTIVATION.

All orchard soils should be kept well worked during the summer months. It is very essential that the trees should have an abundant supply of moisture during the whole of the growing season. This will mean an increased supply of fruit buds for the next season, consequently the frequent summer cultivation of the soil will be a necessity if the health and vigour of the trees are to be maintained.

Excessive transpiration is often the cause of loss of young trees and of new grafts. They are found to part with a large amount of moisture, and are not able to obtain or retain sufficient for their nourishment; they then very soon wither and die. The soil around these should always be kept well stirred; they may also be given a good straw or grass mulching, and an occasional overhead sprinkling will greatly benefit them.

The planting out of citrus trees may be continued, sheltering the tender plants from winds with hessian or breaks of scrub.

The general aims in summer cultivation should be to maintain a good loose earth mulch during the whole season, and to keep down all weeds and useless orchard growths.

PRUNING.

Summer pruning may now be commenced, particularly on apple, pear, and plum trees. The removal or reduction of surplus leader growths, the shortening of unduly long laterals, and the thinning out of crowded shoots, will all tend to strengthen other parts of the tree and to increase the development of new fruit buds.

The Vegetable Garden.

Tomatoes will require much attention at this time of the year. If the plants have been well looked after, they should be making vigorous growth. It will be to advantage to tie the plants to stakes, training them to two or three main growths, and pinching out all laterals as they come.

The plants should be well watered, and occasionally a handful of bonedust and blood manure mixed should be forked in around the roots. Where stable manure is used, it should be used as a mulch, forking it in every three or four weeks, and making a fresh mulch.

It is now recommended that occasional doses of sulphate of potash as a manure for tomatoes will help the plants to resist the spotted wilt.

All plants of the cucumber and melon family should now be constantly supplied with ample water. Pinch out unnecessary lateral growths, and also the terminals.

The following seeds may now be sown:—French beans, cabbage and cauliflower for winter crops, parsnip, lettuce, and celery.

The side shoots of celery plants should be removed, afterwards earthing up the plants. Asparagus beds should be top-dressed, and allowed to grow without any more cutting. The vegetable beds will need frequent forking and hoeing to keep the soil sweet, and to keep down all weeds.

The Flower Garden.

Plant out dahlias this month; green plants early, and plants grown from tubers later in the month. Water well at planting, and keep well cultivated afterwards.

Rose bushes and beds may be given a good mulch with light stable manure, straw, grass, or lawn clippings. The beds should be kept rather dry, so as to allow the plants to rest before the autumn period of growth.

Sow seeds of cosmos, asters, zinnia, balsams, cockscomb, and other late summer and autumn blooming annuals.

Cut down delphiniums that have yielded their first crop of flowers, so as to allow a succession of flowers to come.

Daffodil, hyacinth, tulip, ranunculus, anemone, and other bulbs and tubers may be taken up and stored; while gladioli corms may still be planted.

The garden must be kept well watered and cultivated, so as to tide the plants over the hot and dry season.

REMINDERS FOR JANUARY.

LIVE STOCK.

HORSES.—*Stabled.*—Over-stimulating and fattening foods should be restricted. Water should be allowed at frequent intervals. Rub down on coming into stables in an overheated condition. Supply a ration of greenstuff, where possible, to all horses. *Brood mares* should be well fed on succulent food if available; otherwise, oats and bran should be given. *Foals* may with advantage be given oats to the extent of 1 lb. for each month of age daily. Provision should be made for shade shelter for paddocked horses.

CATTLE.—Provide succulent fodder and plenty of clean water and shade. Provide "lick" in trough, consisting of salt 20 lbs., lime 20 lbs., superphosphate 5 lb., and sulphate of iron 1 lb. Limewash the cow bails, it helps to keep down flies. Provide calves, if possible, with good grass run, or lucerne hay or oats in a trough. Now that the Dairy Produce Act is in operation it is necessary to take proper care of milk and cream, as it must be paid for according to its quality. Utensils must be kept clean and well tinned. Cream must be cooled and kept cool and delivered fresh to the factory. Write to the Department of Agriculture for "Hints to Dairymen."

PIGS.—Supply short bedding in well-ventilated styes. Keep styes clean and dry, and feeding troughs clean and wholesome. Sows suckling young should be well fed to enable them to produce plenty of milk. Give young pigs pollard and skim milk in separate trough as soon as they will take it, and keep them fattening from the start to get them off as early as possible. Give a tablespoonful of bone meal or superphosphate per 100 lbs. live weight in food daily. If pigs are lousy, dress with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect styes. Plenty of water should be available for them to wallow in in hot weather.

The automatic feeder described and illustrated in Bulletin 16 is proving a great success.

SHEEP.—The various breeds of ewes come in season approximately during the following months:—Merinoes and comebacks, November and December; Cross-breeds, January and February; Pure British breeds, February and March. Be sure of ample rams running with them. Join best rams first. Clean up with those not quite so good. Use only rams with width and substance, and never inferior-fleeced ones. Rams during summer are rarely to be seen working in the day time. It is not always necessary to yard the ewes. Breed from only good-fleeced, roomy, sound-mouthed ewes. Keep in view wool production as well as a shapely, good forequarter export carcass. Lamb, mutton, and fine to medium grade wool will be amongst the foremost commodities for some time to come. Two-tooth ewes, if well grown, can be bred from, "if they're big enough they're old enough," but they must be well treated throughout. Purgative drenches, worm pills, &c., should be given to any ewes hollow and off their feed, lambs scouring, or grown sheep showing unhealthy discharge, as the cases may be. In persistent instances, the second and third doses. Healthy sheep are rarely fly-blown.

POULTRY.—Separate the sexes; the cockerels should now be fattened and marketed. Grade the young stock according to age and size, otherwise the younger birds will not thrive. Avoid overcrowding. Do not force pullets too much with animal food; build them up with a good variety of food, but avoid maize, and give but little meat. Increase the green food; thoroughly spray houses and perches with an emulsion of kerosene and soapsuds, or a solution of carbolic acid 1 in 60. Keep water vessels in shady spot, and renew water twice daily.

BEE-KEEPING.

January being usually the hottest month of the year, combs may melt down on very hot days in hives made out of cases unless they are in some way shaded during the hottest part of the day. If bags are used, they should be removed again as soon as the hot weather is over, because they afford hiding places for bee moths, spiders, and other enemies of bees.

With factory-made or other hives, the walls, cover, and floor of which are of timber not less than $\frac{3}{4}$ inch in thickness, there is no need to provide artificial shade, provided the entrance is of sufficient width and the hive of ample capacity to accommodate the bees. The ordinary entrance, which is 5-16 inch deep and the width of the hive, is generally sufficient. It may, however, be enlarged by raising the hive another $\frac{1}{4}$ inch or so in front should there be much clustering out of the bees.

Top ventilation should not be given; it is not necessary, and the bees dislike it. Bees control the temperature inside the hive by fanning at the entrance and by moistening the combs with water.

During this and the next month bees generally supersede queens in their third year, or which are failing during the second. Queens are sometimes still quite prolific, but by some means the bees know that they would not live through the coming winter, and that it is necessary to raise a successor while drones are still flying, so that the young queen may not remain unfertilized. The queen-cells, which bees construct when superseding, are few—one or two, rarely more. They are generally built on the face of one of the outer combs, often one containing no other brood—not on the edge of a brood comb, as in the case of swarm cells.

Supersedure queen cells must not be mistaken for swarm cells and destroyed, otherwise the hive may eventually become queenless.

All colonies should be examined to see that each has a laying queen. It sometimes happens that the virgin queen of a swarmed stock is lost on her mating flight, and as there is then no young brood in the hive from which to raise another queen, the colony becomes hopelessly queenless. Therefore, whenever neither young brood nor eggs are seen in a hive, a comb of young brood or eggs from some other colony should be given to the bees. If, on examination a few days later, queen-cells have not been raised, then there is a virgin queen in the hive which may be expected to commence laying within a fortnight at the outside.

CULTIVATION.

FARM.—Get all crops harvested and stacked as soon as possible. Horse-hoe maize, potatoes and other summer crops. See to insurance of stacks of grain and hay.

ORCHARD.—Keep the soil well scarified and weed free. Cultivate after irrigation or rain. Do not allow the surface to become caked. Spray against codlin moth, pear slug, vine caterpillar, and woolly aphis. Summer prune strong growing shoots and laterals.

VEGETABLE GARDEN.—Plant out all seedlings, when ready, from former sowings. Stir and mulch the surface. Dig each plot as it becomes vacant. Sow seeds of cauliflower, cabbage, peas, French beans, Kohl Rabi, &c.

FLOWER GARDEN.—Keep the soil moist and cool by watering, hoeing, and mulching. Stake tender and lengthy plants. Water and shade young plants. Sow pansy, Iceland poppy, cosmos, aster, &c.

VINEYARD.—Summer bud or *Yema* grafting may be practised in January, though February is the usual month. (See Bulletin No. 35, obtainable on application.) This is the slackest month in un-irrigated vineyards—all ordinary work should be completed before Christmas. It is only exceptional operations, such as scarifying after rain, sulphuring in case of odium, or spraying for downy mildew, that must be carried out. Should heavy rain fall it will be necessary to repeat spraying in order to insure adequate protection. The final spraying, to protect foliage, and thus permit fruit to ripen, should be applied in January; the exact date will depend on the weather. In irrigated vineyards the application of water, and the cultivation it necessitates, require attention. Make it a rule to spray immediately before watering.

Cellar.—Fill up regularly and keep cellar as cool as possible. Towards end of month commence to make preparations for the coming vintage.



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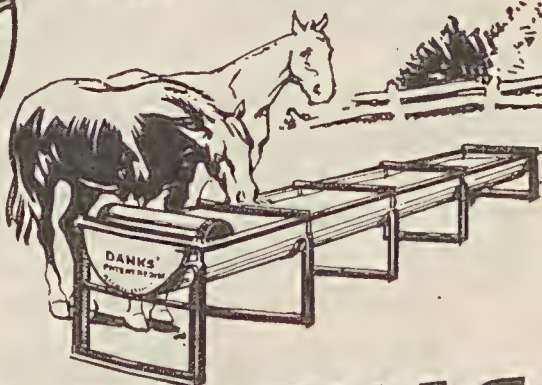
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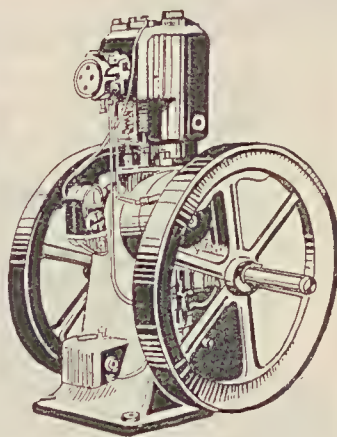
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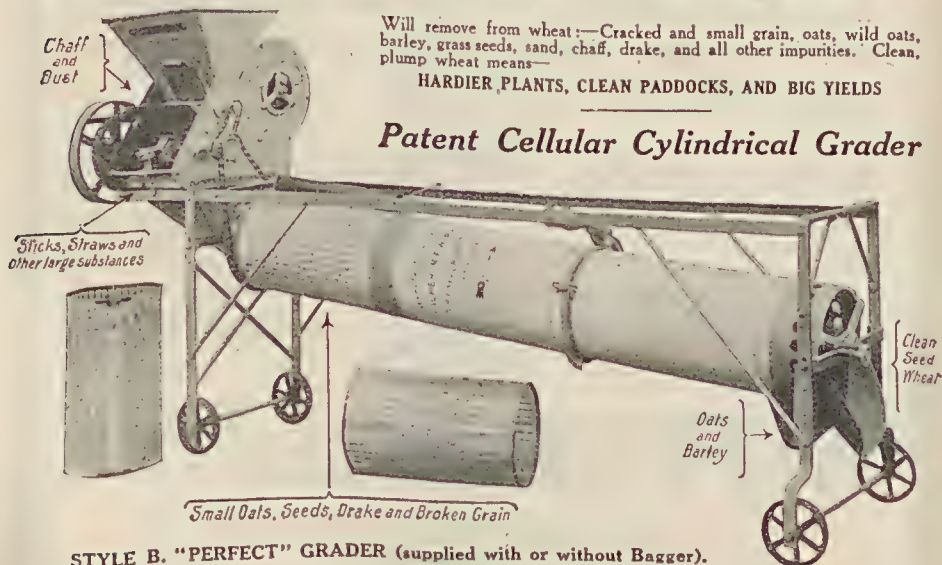
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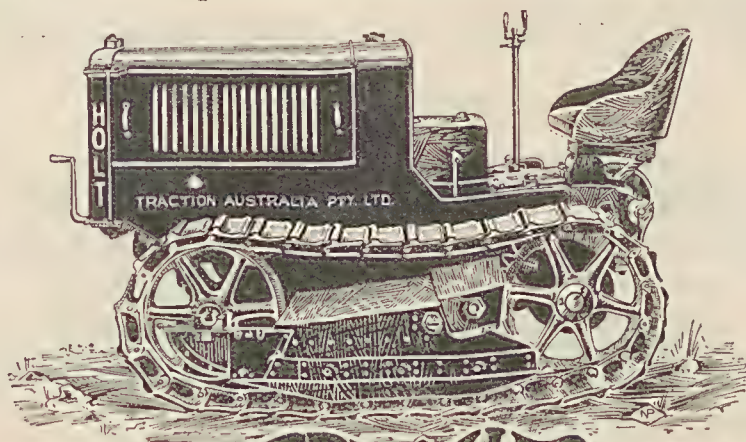
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Bull Calves for Sale

(1) Bull Calf *ex* Dominion Belle Corona

Dropped 24th January, 1923

(Registered No. of Dam 369 Friesian Herd Book of Australia, Vol. 2).

Sire: **Victoria Songboy (359)** by Dominion Domino Dutch Boy (1206 N.Z.F.H.B.) (73 F.H.B.A.).

Sire of Dam: **Oak de Kol 2nd Homestead Fobes** (imp. to N.Z. from America) (341 N.Z.F.H.B.).

Dam's Record for 273 days under Government Herd Test—

11,646 lbs. Milk; 3·61 Test; 420 lbs. Butter Fat.

For Full Lactation Period—

11,715 lbs. Milk; 3·61 Test; 424 lbs. Butter Fat.

(2) Bull Calf *ex* Dominion Proud Lassie

Dropped 26th February, 1923

(Registered No. of Dam 368 Friesian Herd Book of Australia, Vol. 2).

Sire: **Victoria Songboy (359)** by Dominion Domino Dutch Boy (as above).

Sire of Dam: **Woodcrest Jo** (imp. to N.Z. from America) (334 N.Z.F.H.B.).

Dam's Record for 273 days under Government Herd Test—

11,336 lbs. Milk; 3·42 Test; 387 lbs. Butter Fat.

For Full Lactation Period—

12,216 lbs. Milk; 3·51 Test; 428 lbs. Butter Fat.

(3) Bull Calf *ex* Dominion Hyacinth

Dropped 29th August, 1923

(Registered No. of Dam 374 Friesian Herd Book of Australia, Vol. 2).

Sire: **Victoria Songboy (359)** by Dominion Domino Dutch Boy (as above).

Sire of Dam: **Oak de Kol 2nd Homestead Fobes** (imp. to N.Z. from America) (341 N.Z.F.H.B.).

Dam's Record for 273 days under Government Herd Test—

11,512 lbs. Milk; 4·08 Test; 479 lbs. Butter Fat.

For Full Lactation Period—

13,898 lbs. Milk; 4·24 Test; 589 lbs. Butter Fat.

The record of Victoria Songboy's dam DOMINION MADRIGAL for 273 days under Government Herd Test is 11,373 lbs. Milk, 3·93 Test, 443 lbs. Butter Fat; and for Full Lactation Period 13,485 lbs. Milk, 4·17 Test, and 563 lbs. Butter Fat. "Dominion Madrigal" is a full sister to "DOMINION QUEEN MERCEDES," third cow of all breeds under Government Herd Test 1923, and Winner "Weekly Times" Butter Competition, Melbourne Royal Show 1923, and Champion Melbourne Royal Show 1923.

INSPECTION of these Bull Calves at the Horticultural Gardens, Burnley, is invited.

APPLICATION FOR PURCHASE to Dr. S. S. Cameron,
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Red Poll Dairy Herd

The Department will shortly have completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter *fat* yielded.

(For Record of Yields of dams see Red Poll Herd Book.)

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BELLIGERENT (Imported)

Dam's Record (1st milking) 7144 lbs. milk.				
Dam's Dam's	14533 lbs. milk	...	4 years average	12871 lbs. milk
Sire's Dam's	10370	...	7	9354
Sire's D. Dam's	9510	...	12	8033
G. Sire's D. Dam's	10215	...	7	9386
G.G. Sire's D. Dam's	12565	...	10	8853
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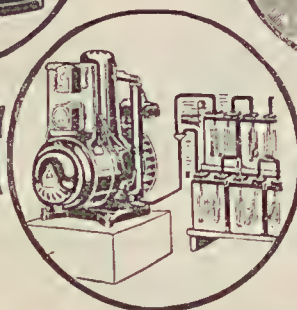
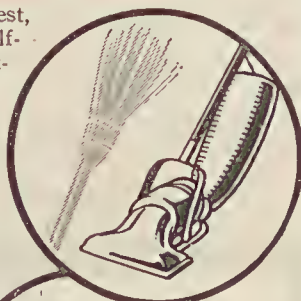
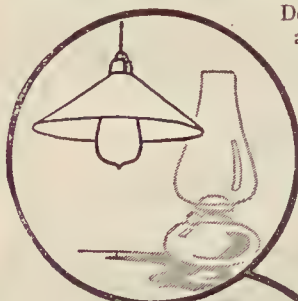
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